orban

ORDERING GUIDE & SUGGESTED LIST PRICES

Professional Audio Products

Revision 9; Effective February 22, 1982

Model	Description	Suggested List Price
111B/1	Spring Reverberation (2 ch) (6 springs/channel)	$849.00
245E	Stereo Synthesizer	$399.00
418A	Stereo Compressor/Limiter	$849.00
422A	Compressor/Limiter/De-Esser (1 channel)	$569.00
424A	Compressor/Limiter/De-Esser (2 channel)	$899.00
516EC	Dynamic Sibilance Controller (3 channel)	$719.00
526A	Dynamic Sibilance Controller (1 channel)	$469.00
622A	Parametric EQ (1 channel)	$509.00
622B	Parametric EQ (2 channel)	$799.00
672A	Mono Graphic Parametric EQ	$629.00
674A	Stereo Graphic Parametric EQ	$1179.00

Prices are domestic U.S. only; F.O.B. San Francisco. Prices based on Buyer's acceptance of Orban Standard Terms & Conditions of Sale and are subject to change without notice. Orban Professional Audio Products are sold worldwide through Authorized Dealers. All units are supplied for 115v, 50/60 Hz operation unless otherwise specified. If 230v, 50/60 Hz operation is required, please specify. See reverse side for accessories.

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803001-000-09 7/82

PROFESSIONAL AUDIO PRODUCTS

ACCESSORIES

	ACCESSORIES FOR 622A/622B	Sugg. List
*RET-5	Balanced output transformer. Order one per output.	$16.00
	ACCESSORIES FOR 672A	
*RET-6	Balanced output transformer. Order one per output.	$16.00
	ACCESSORIES FOR 674A	
ACC-3	Plexiglass security cover for filter section controls.	$ 9.00
*RET-7	Balanced output transformers (2) for main outputs	$32.00
*RET-8	Balanced output transformers (4) for both outputs.	$64.00
*RET-9	2 ckt phone jacks for inputs & main outputs only.	$10.00
*RET-10	2 ckt phone jacks for inputs & all outputs.	$13.00
*RET-11	XLR-type connectors for inputs & main outputs only	$24.00
*RET-12	XLR-type connectors for inputs & all outputs.	$30.00
	ACCESSORIES FOR 422A	
*RET-14	XLR-type connectors for input and output.	$12.00
	ACCESSORIES FOR 424A	
*RET-15	XLR-type connectors for inputs and outputs.	$24.00

*Available installed for free at time of purchase or as a field retrofit kit.

The Orban 424A Gated Compressor/ Limiter/De-Esser

The Studio Optimod



Performance Highlights

- ☐ Intuitive and natural operation
- ☐ Adjustable attack time, release time, and compression ratio permit extremely natural processing or special effects
- ☐ Selectable linear (general purpose) or exponential (special purpose) release time characteristics
- ☐ Defeatable gate with adjustable threshold causes gain to move slowly toward user-adjustable value during pauses, preventing noise rush-up, pumping, or breathing
- ☐ Major controls interact to speed setup by keeping output levels relatively constant as controls are adjusted
- ☐ **Separate** compressor/limiter and de-esser control loops, each with optimized, program-controlled parameters
- ☐ Better than 25dB de-ess gain reduction available **in addition to** 25dB compressor/limiter gain reduction
- ☐ True peak-reading VCA LEVEL meter
- ☐ True peak-reading GAIN REDUCTION meter
- ☐ De-esser characteristics similar to highly-accepted Orban dedicated de-essers
- ☐ Low-distortion operation achieved using clean class-A VCA and distortion-cancelling control circuitry

Plus

- ☐ Rugged all-metal 19" rack mount package for ruggedness, roadworthiness, RFI shielding. Industrial-grade parts and construction
- ☐ Highly cost-effective; available in mono (model 422A) or stereo (model 424A)
- ☐ Multiple channels can be connected to track together
- ☐ Extensive RFI supression
- ☐ Balanced inputs and outputs, and 115/230V 50-60Hz power supply standard

THE 422A IS A SINGLE-CHANNEL VERSION OF THIS PRODUCT

The Model 422A/424A:

A multi-function Compressor/Limiter/De-Esser featuring exceptional versatility and ease of operation

Preface

We're about to say a lot about our 424A: we're proud of it. But no long essay can describe the bottom line—what it sounds like, and how it feels to use it. Comparisons of specifications and descriptions of new control techniques cannot describe the elusive and magical relationship between engineering and hearing.

This brochure should answer questions you might have about why the 424A is such a good-sounding and easy to use product. But when you get right down to it, the best way to appreciate its advanced design is to A/B it against your current favorite. Using it and listening to it are what really count!

The Orban 424A: It Had To Be Better, Or We Wouldn't Have Bothered

There are a lot of production limiters out there. Old favorites. Pretenders to the throne. The competition is fierce, and the market fragmented. So when Orban set out to design a significant new production limiter, we knew it had to be superior.

Fortunately, when we undertook the 424A R&D project, we had seven years of experience behind us. Enough to capture the Number One slot in the broadcast signal-processing market. Ask any FM broadcast engineer what the industry-standard limiter is, and he's likely to tell you it's our OPTIMOD-FM.

We've developed the technology—the **magic** which makes a compressor/limiter sound right, feel right, and operate quickly and intuitively. That's important in today's economic climate, where audio professionals demand fast, superlative results in recording studios, in broadcast production studios, and on the road doing demanding sound reinforcement work.

The result of our research and experience is the model 424A—a Gated Compressor/Limiter/De-esser with versatile features for production, and with a natural, transparent sound that has to be heard to be appreciated.

Our goal was to build a device which would produce the desired sound upon adjustment of a **minimum** number of controls. And, readjustment of one control should not require the corrective readjustment of others. We achieved this goal by making the ATTACK TIME, RELEASE TIME, and COMPRESSION RATIO controls interact with each other and with the threshold of limiting. For example, slower attack times permit more overshoots, so the threshold of limiting is automatically lowered to compensate. The result: you can concentrate on getting the **sound;** the mechanics largely take care of themselves.

The Un-Trendy Limiter

Most of the advertising buzzwords applied to AGC units are irrelevant to the essential listening qualities of these devices. Simultaneously, many of the truly important issues of AGC design (many of which are quite subtle and not easily reduced to buzzwords) seem to be unknown to, or ignored by, others.

The 424A is a very un-trendy device, in that it uses feedback control, an averaging detector, and a conventional "hard knee" static compression curve. Why?

For starters, because the type of detector (whether true-RMS, "linear-integration" averaging, or whatever) is essentially irrelevant, since far more variation results from simply changing the attack time than from changing the detector type. Similarly, the desirability of a consistent output as read on a VU meter is questionable, since VU meter readings have only the most casual correlation to psychoacoustical loudness.

Feedback control circuitry has been accused of hiding the vices of inferior VCA's while introducing instability and high amounts of distortion. Our VCA has nothing to hide, our loop is totally stable, and our measured THD is significantly better than most others on the market—feedback or feedforward. We use feedback because our ears tell us that, properly implemented, it creates a control loop dynamic response which simply **sounds better.**

The "soft knee" compression ratio characteristic promoted by others is a way of making a compressor sound innocuous by "sneaking up" upon high ratios over the course of many dB. Low ratios always sound more graceful than high ratios. In a "soft-knee" compressor, mostly low ratios are used. No wonder the sound of the compressor is improved! Alas, the price exacted is lost loudness and inconsistent level control. This may be fine for certain applications, but not if you're trying to persuade a wide dynamic range vocal to cut through a heavy instrumental backing, or if you're trying to make anything audible at all times.



What then, **does** make a good-sounding compressor/limiter? Primarily, the dynamic response of the control loop. In the 424A, attack and release times are always "automatic" (i.e., program-controlled); the ATTACK TIME and RELEASE TIME controls merely scale the processes faster or slower without giving up the advantages of the program control.

If a slower attack time is chosen, an automatic gain-riding (AGC) function is achieved. Faster attack times introduce more peak limiting. So, depending on attack time, the 424A can serve as a compressor, limiter, or both simultaneously.

What Makes The 424A So Special?

The Orban 424A has a real compression ratio control for those few times when you want to maintain some **real** dynamic range. However, you will probably be astonished at the "openness" and **apparent** dynamic range available even at the "infinite" ratio. You may be even more astonished when you discover the apparent loudness increase achieved without the usual side effects. Virtually any competent compressor can sound natural if it is quiet enough (i.e., if it doesn't actually work very hard). **The real magic is sounding loud and natural simultaneously, as the 424A does.**

After you've lived with a 424A for a while, we suspect that the dust will build up on the ratio control as you realize that, finally, here is a compressor which doesn't have to be cranked back to a 2:1 or 4:1 ratio (whether manually, by choice, or involuntarily, by means of a "soft knee") to sound good! For those of you who won't give up the "soft knee" no matter what, we've hedged our bets: you'll be pleased to know that at the lower settings of the 424A RATIO control, the ratio increases as more gain reduction is used.

There is also control over the **shape** of the release characteristic. Ordinarily, the release characteristic is "linear." (Recovery, in the absence of program material, proceeds at a constant number of dB per second.)

A switch-selectable "exponential" release shape is also provided for special applications. This forces the release to start slowly and to increase in speed as it proceeds.

While it sounds substantially less natural than "linear" on most program material, it can be useful when gain-riding wide-dynamic range single tracks (like vocalists) where the "open" sound of a slow release time is desired, yet quick gain-riding is necessary to make levels more consistent.

The IDLE GAIN control is a unique and unusually useful new feature. This control sets the gain of the compressor when it is in the "idle" mode. (When the compressor is manually defeated by operation of the DEFEAT switch, or, when it is gated by low-level audio or silence.)

In either case, the gain will move smoothly toward a value specified by the setting of the IDLE GAIN control — quickly after manual compressor defeat, and more slowly under gated conditions.

If the IDLE GAIN control is set close to the average gain reduction, then, upon resumption of ordinary compression, there will be minimum gain change in the VCA, and therefore minimum audible side effects will occur. The feature is extremely useful in preventing noise or tape hiss from being pumped up, and in facilitating smooth manual switching of the COMPRESSOR OPERATE/DEFEAT switch during program. Its effect is usually substantially smoother than that of a conventional noise gate.

The OUTPUT TRIM control can be used to force some peak clipping in the VCA in applications requiring tight control of peak levels (like the protection of a broadcast STL), thus controlling fast peaks without need for extremely fast attack times (which almost invariably cause more audible degradation than a modest amount of overshoot clipping). Conveniently, the peak-reading VCA LEVEL meter not only allows you to adjust the 424A to **clip if you want it to,** but also makes it easy to **avoid clipping entirely** if that is your goal.

About Distortion And VCA's

In any compressor/limiter, the static nonlinearities of the VCA are ordinarily totally overshadowed by the dynamic distortions caused by literally intermodulating the input signal by a rapidly varying control voltage. Sometimes such distortion is heard as additional unwanted spectral components, such as traditional harmonic and IM distortion. At other times, it is perceived as unnatural modulations of the signal peculiar to AGC devices such as "pumping," "hole-punching," "shivering," and a whole bunch more which no one has bothered to name, but which most musically-sensitive people can easily hear!

In the Orban 424A, nonlinear control voltage smoothing results in singularly favorable **dynamic** distortion properties. Our proprietary VCA complements this low dynamic distortion by slewing quickly, having "soft" low-order static distortion which is well below the threshold of audibility (due, in part, to class-A operation), and having noise performance which does not deteriorate as the amount of gain reduction increases.

The Final Coup: A Full-Function De-Esser

Finally, our de-esser. The VCA used in the 424A has **two** gain-control inputs. This means that we can add a **no-compromise** de-ess function which is essentially **independent** of the compressor/limiter. As we have proven in our dedicated de-essers, the optimum attack times and release times are quite different for the compressor/limiter and de-esser functions. In the 424A, each function is independently optimized.

The de-esser section of the 424A sounds about the same as our popular dedicated de-essers. It controls sibilance levels by quick broadband gain reduction when excessive "ess" energy is detected. In this way, any low-frequency IM distortion is reduced along with the "ess," and coloration of the "ess" sounds does not occur. One extra benefit of the de-esser section of the 424A is that it can effectively de-ess sibilant vocals which have already been **mixed** with other program, and, in this application, effectively acts more like a high-frequency limiter.

The only essential difference between the 424A de-esser and the Orban dedicated de-essers is that the 424A lacks the dedicated de-essers' ability to provide constant de-essing regardless of input level. In the 424A, this does not create a problem since it was assumed that the input to the de-esser section would be compressed by the 424A's compressor/limiter and would therefore be at a constant level. LED's indicating NORMAL/HEAVY de-essing allow the SENSITIVITY control of the de-esser to be readily adjusted.

A STEREO COUPLING switch allows you to operate the two channels of the 424A independently or in stereo. In stereo, the channels will typically track within ±0.5dB. Rear-panel coupling terminals allow tracking an unlimited number of channels together.



Applications

The 424A can be applied anywhere that current compressors, limiters, and/or de-essers are used, since its versatility does not limit it to a single "sound," but instead lets it operate as a smooth, gentle compressor, a peak limiter, a de-esser, or any combination of these — all with a singular absence of undesirable artifacts.

This means that the unit can be used in recording studios, in broadcast production studios, ahead of broadcast studio-transmitter links, in sound reinforcement, and in video production and sweetening. It is an ideal all-in-one vocal processor, combining the necessary AGC and de-esser functions. It also shines when smoothly handling **mixed** program material — making it excellent for preparing cassette duplicating masters, or protecting tape recorders and cart machines from overload in tight time-pressure situations in broadcast and recording. Simultaneously, its versatile, wide-range setup controls make it a natural for processing single instrumental or vocal tracks in studios. Exploitation of the VCA clipping feature can result in substantially more natural peak limiting than most simple "limiters" can provide, resulting in improved performance when protecting broadcast STL's or power amplifiers in sound reinforcement systems.

Summary

The 424A "Studio Optimod" is the answer to many engineers' dreams. It combines a compressor, limiter, and de-esser in a most versatile way. Because its controls interact in a carefully human-engineered manner, it is easy and graceful to operate. Yet full flexibility is there to get the sound just right.

The professional audio and broadcast world has lived happily with "old favorite" limiter/compressors for a long time. If you examine the features, sound, performance, and price of our new "Studio Optimod" Model 422A/424A, we think you will agree that it is the new standard in dynamic range control. But we don't expect you to take our word for it. The proof is in the **listening.** We feel confident that once you A/B our unit against any of your current favorites, you will find a place for it in your rack. It's that good. A truly superior device, at the right price, at the right time.

Rest assured that with your new 422A/424A, you will continue to receive all the other things that you've come to expect from Orban products over the years — quality construction, comprehensive operating and service manuals, and unequalled customer service.

SPECIFICATIONS

INPUT
Impedance: greater than 10 k ohms active balanced; RF suppressed
LEVEL: −15dBm produces 10dB gain reduction with ATTACK TIME control centered, INPUT ATTEN control fully CW, and RATIO control at infinity-to-one

OUTPUT
Impedance: approximately 100 ohms, electronically balanced to ground; RF suppressed
Level: +4dBm nominal; absolute peak overload occurs at +26dBm

FREQUENCY RESPONSE
±0.25dB 20-20,000 Hz below limiting and de-esser thresholds

COMPRESSOR/LIMITER SECTION
Attack Time: manually adjustable in approximate range of 500us to 200ms; automatically scaled by program content
Release Time: adjustable in approximate range of 0.8dB/sec to 20dB/sec; automatically scaled by program content. Switch-selectable LINEAR and EXPONENTIAL release shapes.
Compression Ratio: adjustable from 2:1 to infinity-to-one at threshold. Lower ratios automatically increase beyond threshold.
Range Of Gain Reduction: 25dB
Tracking Of Multiple Channels: ±0.5dB
Total Harmonic Distortion (ATTACK and RELEASE TIME controls centered; infinite RATIO; 15dB gain reduction): less than 0.03% @1kHz. Typically 0.11% @20Hz; 0.02% @100Hz; 0.01% @1kHz; 0.04% @10kHz.
SMPTE IM Distortion (controls set as above; 60/7000Hz 4:1; 15dB gain reduction): typically 0.05%

DE-ESSER SECTION
Attack Time: approximately 1 ms
Release Time: approximately 30 ms
Harmonic Distortion: less than 0.05% THD introduced by de-essing action @10kHz
Available Gain Reduction: greater than 25dB

SYSTEM NOISE
RMS noise in 20-20kHz bandwidth better than 85dB below output clipping threshold for any degree of gain reduction; 90dB typical.

OPERATING CONTROLS
Compressor/Limiter
INPUT ATTENUATOR
COMPRESSION RATIO
ATTACK TIME
RELEASE TIME
RELEASE SHAPE
GATE THRESHOLD
OUTPUT TRIM
IDLE GAIN
COMPRESSOR/LIMITER OPERATE/DEFEAT
OUTPUT LEVEL (REAR PANEL)
De-Esser
THRESHOLD
DE-ESSER OPERATE/DEFEAT
General
STEREO COUPLING (424A only)
POWER ON/OFF

INDICATORS
Compressor/Limiter
GAIN REDUCTION METER
GATED LED
VCA LEVEL METER
De-Esser
NORMAL De-essing LED
HEAVY De-essing LED

Power Requirement
115/230 VAC ±10%; 50-60Hz. U-ground power cord attached; RF suppressed

Dimensions
19" (48.3cm) wide x 3.5" (8.9cm/2 units) high x 10" (25.4cm) deep

Operating Temperature
0-45 degrees C

Warranty
One year, parts and labor. Subject to limitations set forth in our Standard Warranty Agreement.

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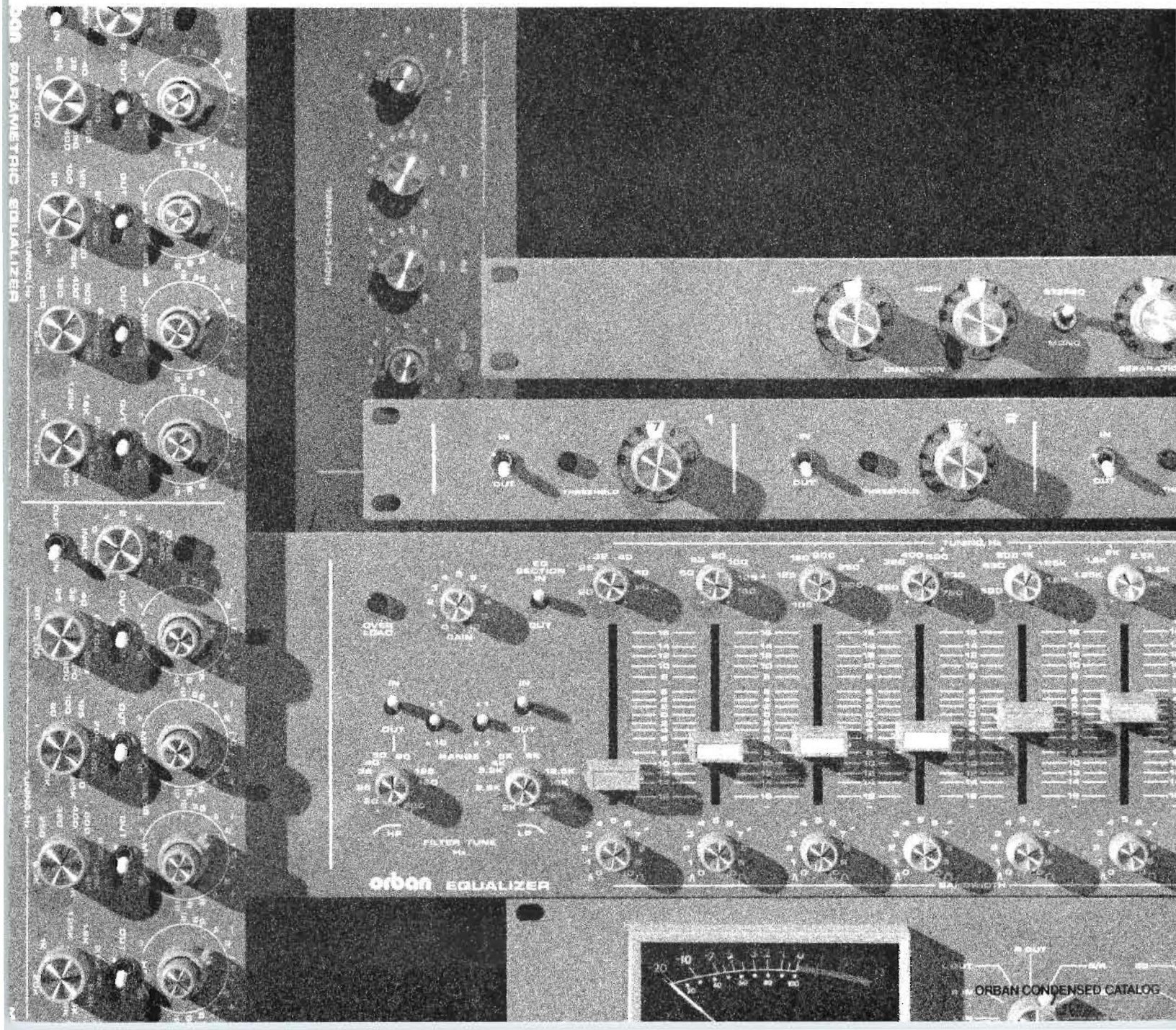
Orban Condensed Catalog

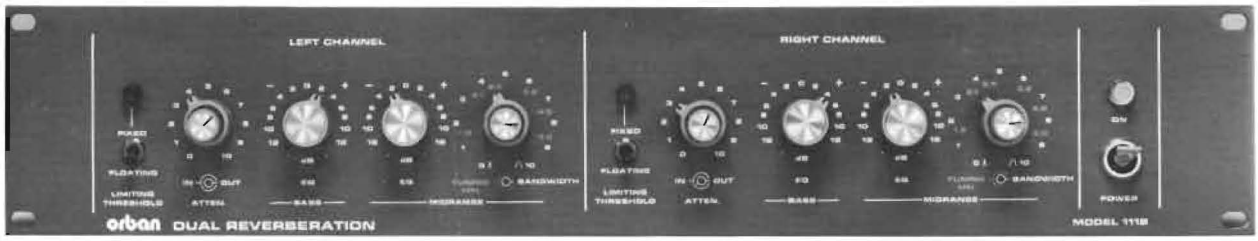
Professional Audio Products

All Orban products are designed to meet the requirements of the most demanding professional users.

Detailed brochures which include full specifications are available on request from Orban dealers worldwide.

All products are equipped with 115/230V 50-60Hz power supplies and carry a One-Year Limited Warranty.





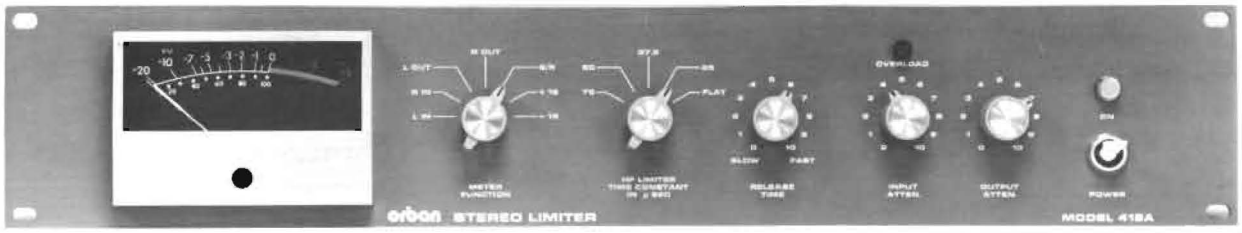
111B Reverberation

Dual-channel spring reverb with six springs/channel for smoothness and natural sound. "Floating threshold" limiter attenuates "spring twang" and protects against overload. Shelving bass and quasi-parametric midrange EQ. Unbalanced input accepts line-level or semi-pro (medium level) gear. Transformer-balanced main output; unbalanced "mixed" output allows use "in-line" without external mixers. Compact, rugged, and reliable.



245E Stereo Synthesizer

Creates a seductive pseudo-stereo effect from mono originals. Left and right channels sum back to original mono for total compatability in disc cutting and FM stereo broadcast. Doesn't affect the frequency balance of the mono original. Easy to use; only three operating controls. Unbalanced line-level input and outputs.



418A Stereo Compressor/Limiter

Famous OPTIMOD-FM circuitry adapted for production and recording applications. Exceptionally smooth sound with adjustable program-controlled release time. Separate high frequency limiter with four selectable breakpoints from 25 to 75us. Simple, easy-to-use stereo-ganged controls. Accurate stereo tracking. Balanced line-level inputs; unbalanced outputs. Ideal for processing complex program material in cassette duplication, broadcast production, and recording studios.



424A Gated Compressor/Limiter/De-Esser

A multi-purpose dynamic range control device with optimized, program-controlled parameters. Manual adjustment of compression ratio, attack and release times, gating threshold, and de-esser sensitivity. Available in mono or dual-channel (with stereo coupling).



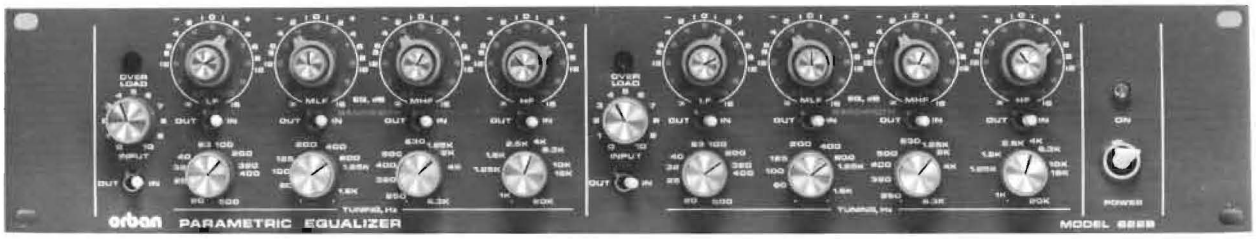
516EC Dynamic Sibilance Controller

Three-channel de-esser with unbalanced line-level inputs and outputs. Ideal for simultaneous de-essing of several voices in cinema, recording, or broadcast. Easy to adjust with single THRESHOLD control. De-essing constant over 15dB input range. De-essing defeatable without clicks or pops. Outstandingly quiet and clean.



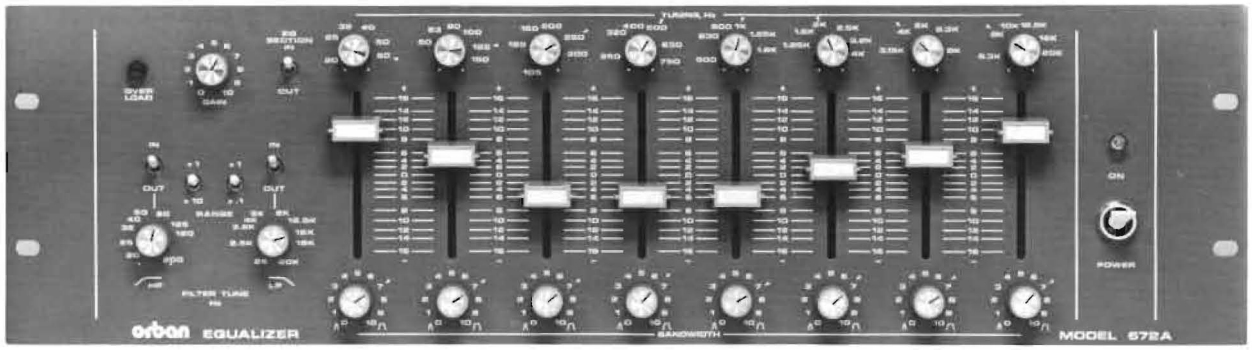
526A Dynamic Sibilance Controller

Effective de-essing without audible "action". De-essing constant over 15dB input level range. Easy to set up and use—only two operating controls (GAIN and THRESHOLD). Fully balanced transformer-coupled input and output with mic/line switching on input. Can be inserted and removed from circuit without clicks or pops. Convenient LED level and de-essing indicators.



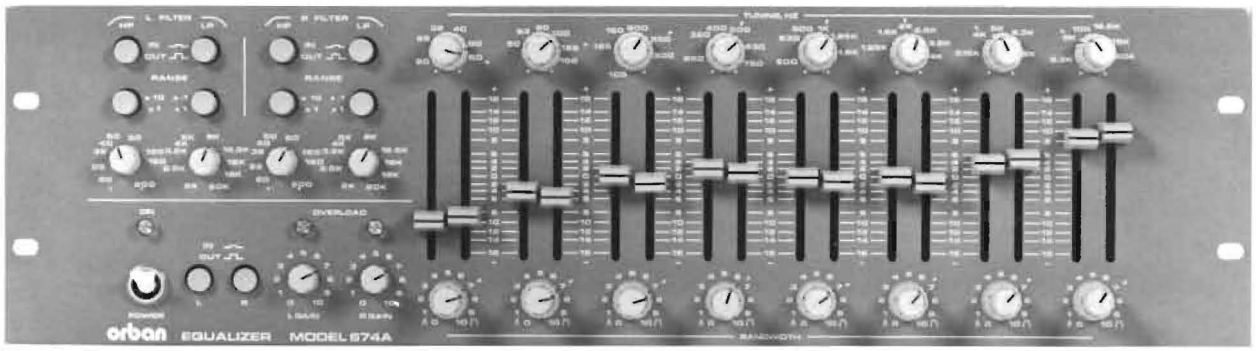
622B Parametric Equalizer

A two channel parametric equalizer for use where continuous, non-interacting control over center frequency, bandwidth, and amount of peak boost or cut is desired. Four peaking bands per channel with "constant-Q" curves providing notching capability; individual channel and band in/out switches; GAIN control; overload lamp. Line-level balanced input and unbalanced output. Output can be balanced by addition of optional transformer.



672A Equalizer

A single channel quasi-parametric equalizer with continuous control over center frequency, bandwidth, and amount of peak or dip. Convenient graphic-style EQ controls provide reciprocal EQ in eight bands. Additional 12dB/octave highpass and lowpass filters tune continuously over 100:1 frequency range. Additional lowpass output permits use as equalizer cascaded with electronic crossover. GAIN control; overload lamp; IN/OUT switches for equalizer and each filter. Line level balanced input; unbalanced outputs can be balanced with optional transformer(s).



674A Equalizer

A two-channel version of the 672A. Controls are configured to facilitate accurate, easy adjustment of both channels simultaneously when equalizing stereophonic program. Each channel identical to the 672A, including all controls and overload indicator, with the exception that the electronic crossover outputs are arranged as "MAIN/LOWPASS" and "HIGHPASS" to provide further protection against accidental tweeter burnout should IN/OUT switches be incorrectly operated.

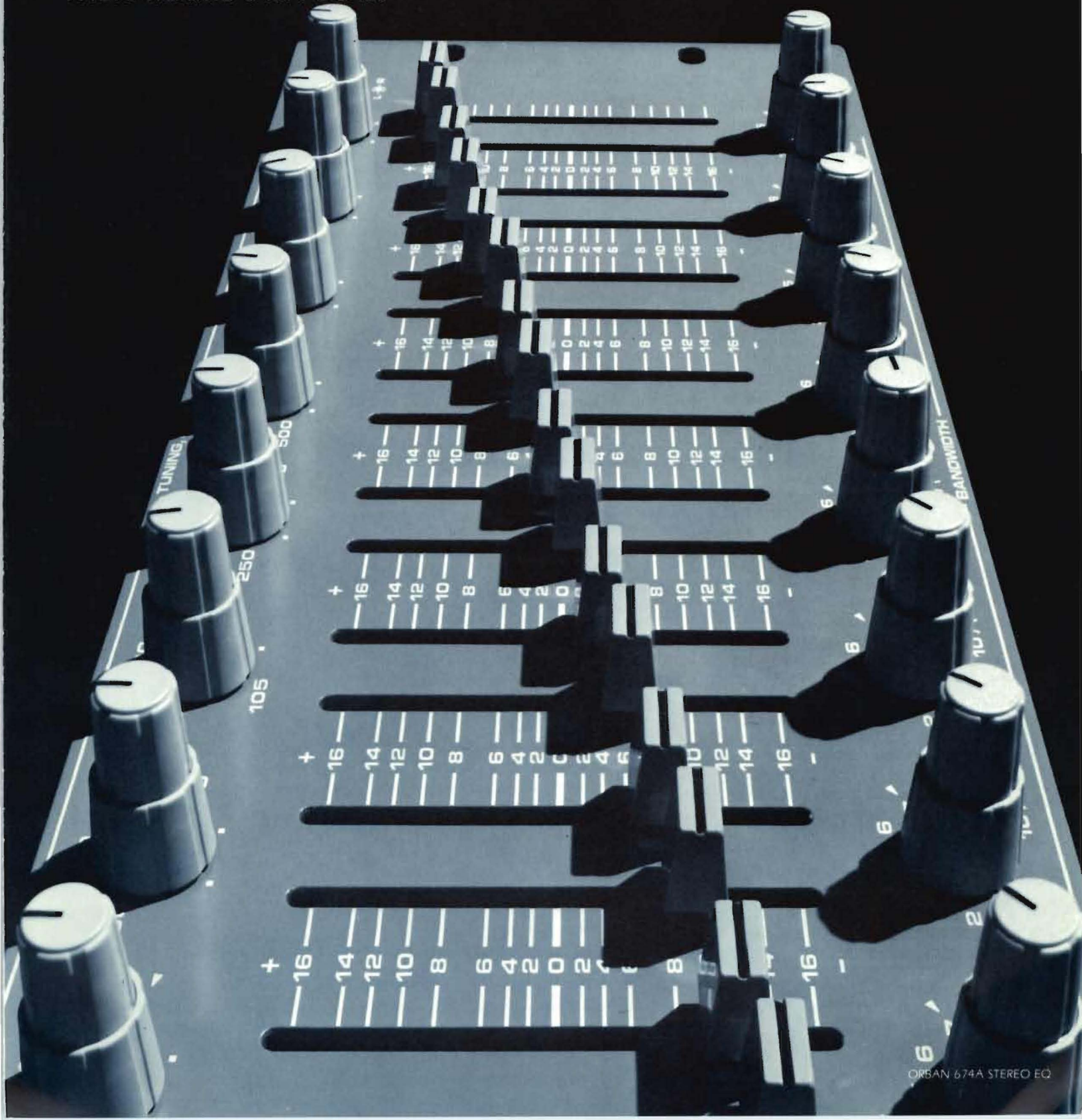
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The Orban 674A Stereo Equalizer

The versatility of a parametric; The economy of a graphic... More flexible than either.



PERFORMANCE HIGHLIGHTS

EQ Section

- ☐ Eight bands per channel, each with TUNING AND BANDWIDTH controls
- ☐ Each band tunes over 3:1 frequency range
- ☐ "Q" typically variable between 0.3 and 20 (center TUNING)
- ☐ ± 16dB equalization range
- ☐ EQ controls are long-throw dust-shielded slidepots for good resolution
- ☐ TUNING and BANDWIDTH controls marked with "tics" indicating typical settings
- ☐ Narrowband notching capability ideal for sound reinforcement
- ☐ Bands totally non-interacting
- ☐ A dedicated stereo device with controls arranged for optimum ease of maintaining stereo balance

HP/LP Filter Sections

- ☐ Each section continuously tunable over 100:1 range in 2 decades
- ☐ Each section independently switchable
- ☐ 12 dB/octave slopes
- ☐ Filters follow graphic section. Separate main/lowpass and high-pass outputs allow use as filters or as full electronic crossover

General

- ☐ Very low noise and distortion
- ☐ High slew rate for minimum TIM (SID)
- ☐ Front-panel GAIN controls; 12dB gain available
- ☐ "Peak-stretching" overload lamps warn of clipping anywhere in equalizer
- ☐ Active balanced inputs; unbalanced outputs. Transformer-balanced outputs optional
- ☐ RF suppression on inputs, outputs, and power leads
- ☐ 115/230V, 50-60Hz transformer is standard
- ☐ Industrial-grade parts and construction including socketed IC's
- ☐ Highly cost-effective

A MONO VERSION OF THIS PRODUCT IS ALSO AVAILABLE AS MODEL 672A

Introducing the 674A Stereo Equalizer

The Orban 674A is a cost-effective, professional, quasi-parametric equalizer with the convenience of graphic-type EQ controls. Wide-range high- and low-pass filters with 12dB/octave Butterworth slopes follow the EQ section for added versatility. The 674A has two outputs per channel, arranged so that these filters can also be used as a fully tunable electronic crossover.

The space-saving 674A offers the facilities of two complete mono 672A's in a single chassis. Ganged, concentric controls make one-hand stereo operation of bandwidth and tuning a snap. Graphic-style EQ controls are split parallel for each of the eight bands. Separate high-and low-pass filters on each channel offer stereo two-way electronic crossover capability.

While it is possible to operate the unit with two unrelated mono program sources, under some circumstances high-frequency crosstalk may be experienced. Therefore, crosstalk requirements should be evaluated in such applications. (See Specifications)

The 674A is a professional product designed to provide a large measure of versatility, convenience, and quality at a very attractive price. While it meets the requirements of the demanding professional, it is also designed and priced to make it understandable and available to the advanced audiophile.

To make the 674A easy to use in situations where its full versatility isn't needed, "tic" marks have been included on the dial calibrations of the TUNING and BANDWIDTH controls. When these controls are set to the tics, the 674A behaves like a standard octave-band graphic equalizer with the eight bands on ISO frequencies from 63 to 8000Hz.

Each feature of the 674A has been thoughtfully chosen and cleverly implemented to make the equalizer a particularly powerful tool in nearly all areas of audio: sound reinforcement, public address, recording studio, broadcasting, motion picture sound, disco, theater...

Why "Quasi-Parametric"?

There are two basic types of parametric equalizer: **full-** and **quasi-**parametric. Orban manufactures both types. Both offer far more effective control than other kinds of equalizers, like graphics. Our popular dual-channel 622B is a **full** parametric. This means that you have **totally non-interacting** control over the three fundamental **parameters** of equalization: the **amount** of peak boost or dip (in dB), the **tuning** (the frequency most affected by the equalization), and the "Q" (which relates to the sharpness of the EQ curve—the degree to which frequencies on either side of the peak frequency are affected by the equalization). As opposed to our 622B Equalizer, the 674A is **quasi**-parametric. This means that the "Q" changes when you adjust the TUNING and/or EQ controls. Other control adjustments are completely non-interacting: TUNING and EQ do not affect each other.

The other important performance difference between the full-parametric 622B and the new 674A is that the 622B's EQ curves are "**constant-Q**"; the 674A's curves are "reciprocal". "Constant Q" curves are valuable in that they permit infinite-depth notches to be created; reciprocal curves limit the maximum cut to the same number of dB as the maximum boost. In the case of the 674A, 16dB of cut is available. This is fine for tuning out ring-modes in sound reinforcement systems, but might not be adequate in all circumstances to remove hum or other fixed-frequency interference from a signal. On the other hand, some people prefer reciprocal curves because the boost and cut are mirror images of each other, thus permitting previous equalization to be readily "undone" later. Careful design of the circuitry gives the 674A **In boost mode** a characteristic similar to the 622B's desirable "constant-Q" curve family.

Why did we choose the quasi-parametric technique for the 674A? Because it offers a way to produce a very high quality, stable equalizer at low cost without compromising distortion, noise, accuracy, or reliability.

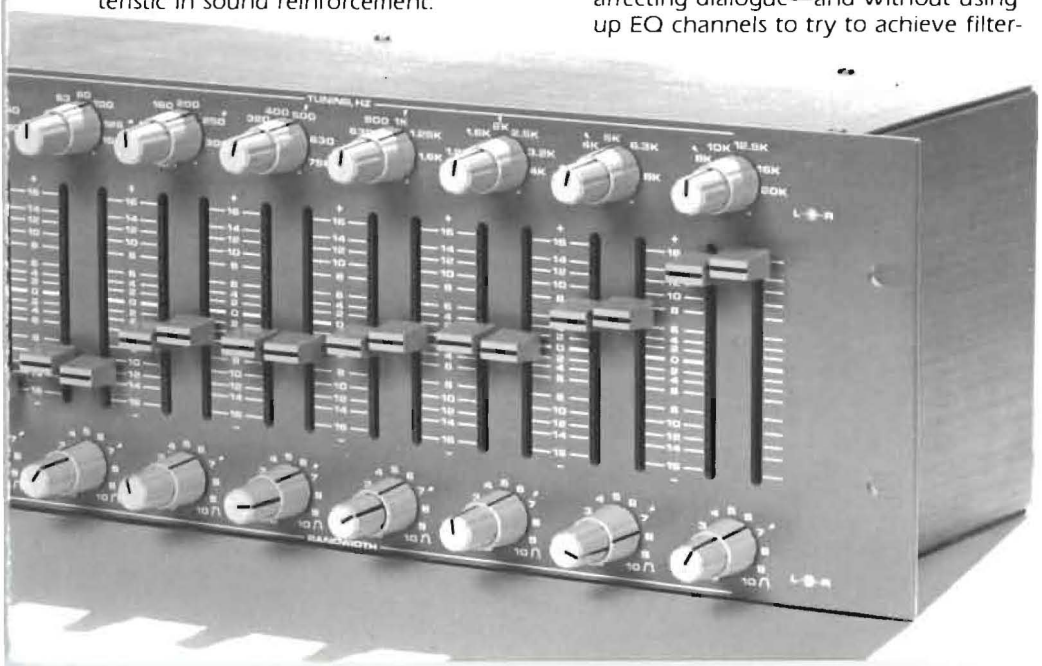


Applications

Sound Reinforcement and Monitor Tuning

There are many ways to use the 674A in sound reinforcement and monitor tuning:
1) In an economy biamped installation, replace both the third-octave equalizer **and** the electronic crossover with the 674A. The 674A's narrowband, tunable notches can deal with ring-modes more effectively than the third-octave unit could. Use three or four of the 674A bands for narrowband notching; leave the rest for wideband EQ.
2) In a higher budget biamped installation, use the 674A as an electronic crossover plus a narrowband, tunable notch filter for ring-mode suppression; incorporate a separate third-octave equalizer to correct the house curve.
3) Use variations of (1) and (2) above **with** an electronic crossover; the 674A's highpass and lowpass filters can then be used to roll off the frequency response of the system in a controlled manner.
4) In a **non-biamped** system (like a stage monitor), use the 674A to equalize the monitor, and use its filters to restrict response in the extreme high and low frequencies.
5) Use the 674A as a **partial** electronic crossover plus equalizer/filter by devoting one channel of 674A equalization to each driver; one filter is required to perform the crossover function; the other can be used for its normal highpass (or lowpass) function.
6) For super power in mono reinforcement applications, connect both channels in series. You'll then get **sixteen** EQ/notch filter bands, an electronic crossover, and an extra set of filters to limit system bandwidth.

In all cases, the BANDWIDTH control can be adjusted to make the totally non-interacting (series-connected) bands "combine"—a most desirable characteristic in sound reinforcement.



Any way you cut it, the 674A's economy and extraordinary versatility make it one of the sound reinforcement practitioners' most useful tools.

Recording Studios

Every recording studio needs a few channels of 674A equalization to handle the tough chores that the internal console equalizers can't deal with. Patch that problem track through a 674A: its fine-tuning ability lets you clean up the track far more effectively than you could with a graphic or "three knob" console equalizer. Use the tunable filters to help eliminate rumble, cymbal splash, kick drum leakage—you name it!

If you need to correct the equalization of a track because of second thoughts during or after the mix, the 674A can create the finishing touches as no ordinary equalizer can. It's better than a third-octave graphic, because the 674A can generate broad, non-ringing boosts, whereas the graphic is much more colored and ringy.

The 674A is also an ideal adjunct to an electronic music synthesizer—you can create high "Q" formats and shape the spectrum so that the sound comes alive.

Motion Picture Sound

The 674A is an ideal replacement for the graphic equalizers ordinarily used for dialogue equalization in motion picture sound. Set the TUNING and BANDWIDTH controls to the "tics" on the panel, and you get the equivalent of a familiar easy-to-operate graphic. But when you **need** the extra control and flexibility—such as notching out the extraneous sounds that always seem to plague location recordings—that power is there instantly, without patching or the use of external dip filters. The high- and lowpass filters are invaluable for cleaning up noise and rumble without affecting dialogue—and without using up EQ channels to try to achieve filtering. In addition, many "effects" (such as telephone, pocket radio, or "old time" recordings) can be easily created with the 674A alone.

In addition, the 674A can be used to equalize the "B-chain" in the re-recording theater to the acoustic response specifications of the studio. The lowpass filter can effectively simulate the "Academy Rolloff" or its current modifications.

Stereo Broadcasting

Use the 674A in the production studio to enhance the announce mike, "sweeten" stereo music, and to create special production effects that make your station stand out among its competitors. Meanwhile, another 674A can be quietly and efficiently equalizing the stereo program line for maximum punch and brightness on the air. Use the 674A to equalize phone or remote lines for flat response—it's much more versatile than the standard phone company equalizers. In the main studio, use it on the announce mike channel to equalize for maximum presence, and also to notch out sounds like mechanical hum from cart machine motors or air conditioning noise. Whatever your application, the 674A's RF suppression and optional output transformer mean problem-free installation in high-RF environments.

Dance Bars

The 674A is an excellent dance bar stereo equalizer. The sound contractor installing the system can offer the management exactly the sound desired—including solid, punchy bass free from muddiness and boom—and an aggressive, sizzling top free from ringing and coloration typical of a full-octave graphic equalizer. The eight bands permit substantial work to be done in flattening out undesired response deviations in the upper bass and midrange. Narrowband notches can even deal with the difficult resonances sometimes encountered in high-efficiency horn-type loudspeakers. In biamped installations, use the separate lowpass and highpass filter outputs as a complete electronic crossover. No other crossover is necessary.

The 674A costs a bit more than an octave-type graphic. But, unlike a graphic, it really **solves** the problem.

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Technical Description

The 674A Equalizer consists of a balanced input buffer amplifier, eight main equalization amplifiers connected in series, and tunable lowpass and highpass positive feedback 12dB/octave Butterworth filters. The output of the highpass filter is buffered to drive 600 ohms, and is available separately. By suitable switch settings, the main output can be made to carry a lowpassed signal. Thus the 674A can be used as an equalizer cascaded with a full electronic crossover, or as an equalizer cascaded with lowpass and highpass filters.

Each amplifier in the equalizer section provides equalization for one band only, assuring no interaction between bands. The total equalization is simply the sum (in dB) of the equalizations provided by each of the sections.

Peak boost is accomplished by adding the output of a two-pole bandpass resonator to the main signal; reciprocal dip occurs when this resonator is symmetrically connected as a feedback element in the main equalizer amplifier.

The EQ IN/OUT switch bypasses the last seven main amplifiers and defeats equalization in the first amplifier. Gain and signal polarity are equal in the IN and OUT modes. As the BANDWIDTH control is operated, the skirts of the equalization curve move in and out, but the peak gain and peak frequency remain constant. As the EQUALIZATION controls are operated, the frequencies of peak gain remain constant. However, as the TUNING control or EQUALIZATION control (in **dip** mode) are operated, the bandwidth ("Q") will change, because of the simplifications in the "quasi-parametric" bandpass resonator. Careful design has enabled us to produce curves (in **boost** mode only) essentially identical to the desirable "constant-Q" curves provided by our 622B **true parametric** equalizer in its **boost** mode.

The EQUALIZATION controls all produce peaking curves; if shelving curves are desired, they can be approximated by tuning the lowest band to 20Hz and the highest band to 20kHz. The breakpoint of the shelving characteristic is then adjusted with the BANDWIDTH control.

Summary

Many people are now aware of the **power** of parametric equalization: the almost sensual satisfaction of getting the sound really **right.** These same people are also demanding professionals, insisting on inaudible noise and distortion, human engineering, quality "feel", and uncompromising reliability.

Orban is well-known for its line of fine parametric equalizers, like the 622B. Now with the 674A, it brings equalization of the same rigorous quality to applications where it could never before be afforded. The 674A is inexpensive enough to qualify it for serious consideration in applications which would otherwise be given by default to a much less able graphic equalizer.

The 674A rounds out the line of Orban "Professionals' Parametrics." Between the 622B **true parametric** and the 674A **quasi-parametric,** there is an equalizer for virtually every need and budget. The Orban "Professionals' Parametrics" are available at your authorized Orban dealer.

Specifications:

All specifications apply when driving 600 ohms or higher impedances. Noise measured on an average-reading meter through a 20-20,000Hz bandpass filter with 18dB/octave Butterworth skirts.

ELECTRICAL

Input:
Impedance, Load (each leg): 100K in parallel with 1000pF, electronically balanced
Impedance, Driving: Ideally 600 ohms or less, balanced or unbalanced
Nominal Input Level: Between −10 and +4dBm
Absolute Overload Point: +26dBm

Output:
Impedance, Source: 47 ohms in parallel with 1000pF, unbalanced (Optional transformer balanced 600 ohm outputs)
Impedance, Load: Should be 600 ohms or greater—will not ring into any capacitive load
Nominal Output Level: +4dBm
Max. Output Level Before Clipping: greater than +19dBm, 20-20,000Hz

Frequency Response:
±0.25dB; 20-20,000Hz: EQ controls set at zero detents

Available Gain:
+12dB; adjustable to -infinity by means of front-panel GAIN control

Slew Rate:
Varies between 6 and 13V/us depending upon setting of GAIN controls; slewing is symmetrical. Internal bandlimiting assures that slew rate limiting will not occur even with the most severe equalization and program material.

Square Wave Response:
Square wave exhibits no spurious ringing at any output level. The only ringing observable is that theoretically associated with any given equalization curve.

Total Harmonic Distortion:
Less than 0.08%, 20-20,000Hz (+18dBm)

SMPTE Intermodulation Distortion:
Less than 0.05% (+18dBm: 60/700Hz, 4:1)

Noise at Output:
Less than −78dBm (EQ in, filters out, controls centered)

Overload/Noise Ratio:
Better than 113dB for any single bandpass filter, for any settings of TUNING or BANDWIDTH controls.

Equalization Ranges:
±16dB peaking EQ, Reciprocal

Tuning Ranges:
20-60Hz; 40-150Hz; 110-310Hz; 230-750Hz; 480-1900Hz; 1.1-4.5Hz; 2.8-9.0kHz; 5.9-21kHz. Dials calibrated at ISO preferred frequencies.

Crosstalk:
Typically better than −55dB @ 20kHz; improves at 6dB/octave below that frequency.

"Q" Range:
Greater than 0.5 to 10 for any setting of the TUNING control.

Low Pass Filter Section:
Tunable in 2 ranges: 200-2000Hz or 2.0-20kHz, 12dB/octave, (2nd-order Butterworth)

High Pass Filter Section:
Tunable in 2 ranges: 20-200Hz or 200-2000Hz, 12dB/octave, (2nd-order Butterworth)

Overload Indicator:
Lamp lights for 200ms if the instantaneous peak output of any amplifier rises to within 1dB of its clipping point.

Circuit Design:
Active RC realized with FET-input opamps. Line driver employs discrete transistor current booster.

Operating Temperature:
0-50° C

Power Requirements:
115/230VAC ±10%; 50/60Hz; 12 watts

PHYSICAL

Operating Controls (each channel):
EQUALIZATION, TUNING, and BANDWIDTH for each of eight bands. TUNING, RANGE (×1; ×10), and FILTER IN/OUT for each filter. EQUALIZATION IN/OUT, POWER ON/OFF, and GAIN for entire equalizer.

Panel:
19" × 5¼" (48.3 × 13.3cm): 3 units

Chassis Depth Behind Panel:
5¼" (13.3cm)

Weight:
Net: 11lbs. (5 kg); Shipping: 13½ lbs. (6.1 kg)

AC Cord:
3-wire U-ground to USA Standard

Connectors:
140 type barrier strip (5# screw); holes punched for XLR-type connectors (Switchcraft D3F and D3M or equal)

Circuit Ground:
Available on barrier strip; normally jumpered to chassis.

Options:
1) Plexiglass security cover for EQ and filter sections
2) Balanced transformers in two or four outputs
3) XLR-type connectors on input and two or four outputs
4) Phone jacks on input and two or four outputs

Specifications subject to change without notice

The Orban 672A Equalizer

The versatility of a parametric; The economy of a graphic...
More flexible than either.



PERFORMANCE HIGHLIGHTS

EQ Section

- ☐ Eight bands, each with TUNING and BANDWIDTH control
- ☐ Each band tunes over 3:1 frequency range
- ☐ "Q" typically variable between 0.3 and 20 (center TUNING)
- ☐ ± 16dB equalization range
- ☐ EQ controls are long-throw dust-shielded slidepots for good resolution
- ☐ TUNING and BANDWIDTH controls marked with "tics" indicating typical settings
- ☐ Narrowband notching capability ideal for sound reinforcement
- ☐ Bands totally non-interacting

HP/LP Filter Sections

- ☐ Each section continuously tunable over 100:1 range in 2 decades
- ☐ Each section independently switchable
- ☐ 12dB/octave slopes
- ☐ Filters follow graphic section. Separate main/highpass and low-pass outputs allow use as filters or as full electronic crossover

General

- ☐ Very low noise and distortion
- ☐ High slew rate for minimum TIM (SID)
- ☐ Front-panel GAIN control; 12dB gain available
- ☐ "Peak-stretching" overload lamp warns of clipping anywhere in equalizer
- ☐ Active balanced input; unbalanced outputs. Transformer-balanced outputs optional
- ☐ RF suppression on input, output, and power leads
- ☐ 115/230V, 50-60Hz transformer is standard
- ☐ Industrial-grade parts and construction including socketed IC's
- ☐ Highly cost-effective

A stereo version of this product is also available as Model 674A

INTRODUCING THE 672A EQUALIZER

The Orban 672A is a cost-effective, professional, quasi-parametric equalizer with the convenience of graphic-type EQ controls. Wide-range high- and low-pass filters with 12dB/octave Butterworth slopes follow the EQ section for added versatility. The 672A has two outputs, arranged so that these filters can also be used as a fully tunable electronic crossover.

The 672A is a professional product designed to provide a large measure of versatility, convenience, and quality at a very attractive price. While it meets the requirements of the demanding professional, it is also designed and priced to make it understandable and available to the advanced audiophile.

To make the 672A easy to use in situations where its full versatility isn't needed, "tic" marks have been included on the dial calibrations of the TUNING and BANDWIDTH controls. When these controls are set to the tics, the 672A behaves like a standard octave-band graphic equalizer with the eight bands on ISO frequencies from 63 to 8000Hz.

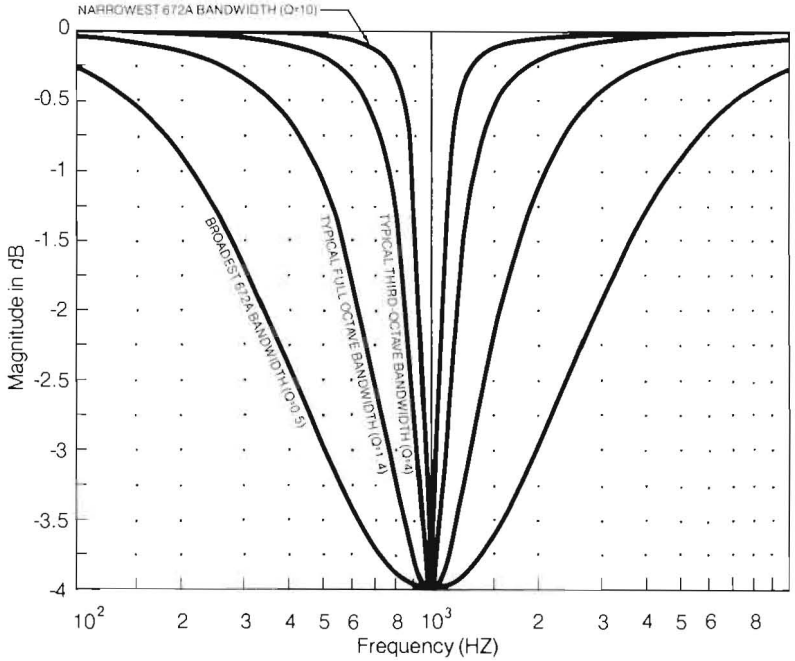
Each feature of the 672A has been thoughtfully chosen and cleverly implemented to make the equalizer a particularly powerful tool in nearly all areas of audio: sound reinforcement, public address, recording studio, broadcasting, motion picture sound, disco, theater...

Why "Quasi-Parametric"?

There are two basic types of parametric equalizer: **full-** and **quasi-** parametric. Orban manufactures both types. Both offer far more effective control than other kinds of equalizers, like graphics. Our popular dual-channel 622B is a **full** parametric. This means that you have **totally non-interacting** control over the three fundamental **parameters** of equalization: the **amount** of peak boost or dip (in dB), the **tuning** (the frequency most affected by the equalization), and the **"Q"** (which relates to the sharpness of the EQ curve—the degree to which frequencies on either side of the peak frequency are affected by the equalization). As opposed to our 622B Equalizer, the 672A is **quasi**-parametric. This means that the "Q" changes when you adjust the TUNING and/or EQ controls. Other control adjustments are completely non-interacting: TUNING and EQ do not affect each other.

The other important performance difference between the full-parametric 622B and the new 672A is that the 622B's EQ curves are **"constant-Q"**; the 672A's curves are "reciprocal." "Constant-Q" curves are valuable in that they permit infinite-depth notches to be created; reciprocal curves limit the maximum cut to the same number of dB as the maximum boost. In the case of the 672A, 16dB of cut is available. This is fine for tuning out ring-modes in sound reinforcement systems, but might not be adequate in all circumstances to remove hum or other fixed-frequency interference from a signal. On the other hand, some people prefer reciprocal curves because the boost and cut are mirror images of each other, thus permitting previous equalization to be readily "undone" later. Careful design of the circuitry gives the 672A **in boost mode** a characteristic similar to the 622B's desirable "constant-Q" curve family.

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Various Bandwidth Dipping Curves — 4dB Dip

APPLICATIONS

Sound Reinforcement and Monitor Tuning

There are many ways to use the 672A in sound reinforcement:

1) In an economy biamped installation, replace both the third-octave equalizer **and** the electronic crossover with the 672A. The 672A's narrowband, tunable notches can deal with ring modes more effectively than the third-octave unit could. Use three or four of the 672A bands for narrowband notching; leave the rest for wideband EQ.
2. In a higher budget biamped installation, use the 672A as an electronic crossover plus a narrowband, tunable notch filter for ring mode suppression; incorporate a separate third-octave equalizer to correct the house curve.
3. Use variations of (1) and (2) above **with** an electronic crossover; the 672A's highpass and lowpass filters can then be used to roll off the frequency response of the system in a controlled manner.
4) In a **non-biamped** system (like a stage monitor), use the 672A to equalize the monitor, and use its filters to restrict response in the extreme high and low frequencies.
5) Use the 672A as a **partial** electronic crossover plus equalizer/filter by devoting one channel of 672A equalization to each driver; one filter is required to perform the crossover function; the other can be used for its normal highpass (or lowpass) function.

In all cases, the BANDWIDTH control can be adjusted to make the totally non-interacting (series-connected) bands "combine" —a most desirable characteristic in sound reinforcement.

Any way you cut it, the 672A's economy and extraordinary versatility make it one of the sound reinforcement practitioner's most useful tools.

Recording Studios

Every recording studio needs a few channels of 672A equalization to handle the tough chores that the internal console equalizers can't deal with. Patch that problem track through a 672A: its fine-tuning ability lets you clean up the track far more effectively than you could with a graphic or "three knob" console equalizer. Use the tunable filters to help eliminate rumble, cymbal splash, kick drum leakage—you name it!

The 672A is also an ideal adjunct to an electronic music synthesizer—you can create high "Q" formants and shape the spectrum so that the sound comes alive.

If you need to correct the equalization of a finished track because of second thoughts after the mix, the 672A can create the finishing touches as no ordinary equalizer can. It's better than a third-octave graphic, because the 672A can generate broad, non-ringing boosts, whereas the graphic is much more colored and ringy.

Motion Picture Sound and Video Sweetening

The 672A is an ideal replacement for the graphic equalizers ordinarily used for dialogue equalization in motion picture sound. Set the TUNING and BANDWIDTH controls to the "tics" on the panel, and you get the equivalent of a familiar, easy-to-operate graphic. But when you **need** the extra control and flexibility—such as notching out the extraneous sounds that always seem to plague location recordings—that power is there instantly, without patching or the use of external dip filters. The high and lowpass filters are invaluable for cleaning up noise and rumble without affecting dialogue—and without using up EQ channels to try to achieve filtering. In addition, many "effects" (such as telephone, pocket radio, or "old time" recordings) can be easily created with the 672A alone.

In addition, the 672A can be used to equalize the "B-chain" in the re-recording theater to the acoustic response specifications of the studio. The lowpass filter can effectively simulate the "Academy Rolloff" or its current modifications.

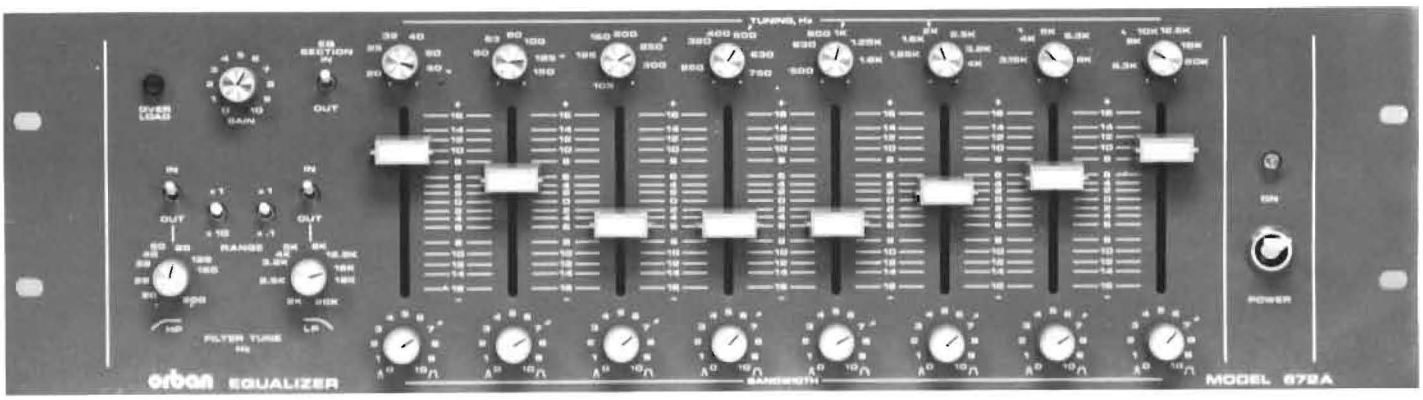
Broadcasting

Use the 672A in the production studio to enhance the announce mike, and to create special production effects that make your station stand out among its competitors. Meanwhile, another 672A can be quietly and efficiently equalizing the program line for maximum punch and brightness on the air. Use the 672A to equalize phone or remote lines for flat response—it's much more versatile than the standard phone company equalizers. In the main studio, use it on the announce mike channel to equalize for maximum presence, and also to notch out sounds like mechanical hum from cart machine motors or air conditioning noise. Whatever your application, the 672A's RF suppression and optional output transformer mean problem-free installation in high-RF environments.

Dance Bars

The 672A is an excellent dance bar equalizer. The sound contractor installing the system can offer the management exactly the sound desired—including solid, punchy bass free from muddiness and boom—and an aggressive, sizzling top free from the ringing and coloration typical of a full-octave graphic equalizer. The eight bands permit substantial work to be done in flattening out undesired response deviations in the upper bass and midrange. Narrowband notches can even deal with the difficult resonances sometimes encountered in high-efficiency horn-type loudspeakers. In biamped installations, use the separate lowpass and highpass filter outputs as a complete electronic crossover. No other crossover is necessary.

The 672A costs a bit more than an octave-type graphic. But, unlike a graphic, it really **solves** the problems.



Technical Description

The 672A Equalizer consists of a balanced input buffer amplifier, eight main equalization amplifiers connected in series, and tunable lowpass and highpass positive feedback 12dB/octave Butterworth filters. The output of the lowpass filter is buffered to drive 600 ohms, and is available separately. By suitable switch settings, the main output can be made to carry a high-passed signal. Thus the 672A can be used as an equalizer cascaded with a full electronic crossover, or as an equalizer cascaded with lowpass and highpass filters.

Each amplifier in the equalizer section provides equalization for one band only, thus assuring no interaction between bands. The total equalization is simply the sum (in dB) of the equalizations provided by each of the sections.

Peak boost is accomplished by adding the output of a two-pole bandpass resonator to the main signal; reciprocal dip occurs when this resonator is symmetrically connected as a feedback element in the main equalizer amplifier.

The EQ IN/OUT switch bypasses the last seven main amplifiers and defeats equalization in the first amplifier. Gain and signal polarity are equal in the IN and OUT modes. As the BANDWIDTH control is operated, the skirts of the equalization curve move in and out, but the peak gain and peak frequency remain constant. As the EQUALIZATION controls are operated, the frequencies of peak gain remain constant. However, as the TUNING control or EQUALIZATION control (in **dip** mode) are operated, the bandwidth ("Q") will change, because of the simplifications in the "quasi-parametric" bandpass resonator. Careful design has enabled us to produce curves (in **boost** mode only) essentially identical to the desirable "constant-Q" curves provided by our 622B **true parametric** equalizer in its **boost** mode.

The EQUALIZATION controls all produce peaking curves; if shelving curves are desired, they can be approximated by tuning the lowest band to 20Hz and the highest band to 20kHz. The breakpoint of the shelving characteristic is then adjusted with the BANDWIDTH control.

Summary

Many people are now aware of the **power** of parametric equalization: the almost sensual satisfaction of getting the sound really **right.** These same people are also demanding professionals, insisting on inaudible noise and distortion, human engineering, quality "feel", and uncompromising reliability.

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Specifications

All specifications apply when driving 600 ohms or higher impedances . Noise measured on an average-reading meter through a 20-20,000Hz bandpass filter with 18dB/octave Butterworth skirts.

ELECTRICAL

Input:
Impedance, Load (each leg): 100K in parallel with 1000pF, electronically balanced Impedance, Driving: Ideally 600 ohms or less, balanced or unbalanced.
Nominal Input Level: Between −10 and +4dBm
Absolute Overload Point: +26dBm

Output:
Impedance, Source: 47 ohms in parallel with 1000pF, unbalanced (Optional transformer balanced 6000 ohm outputs)
Impedance, Load: Should be 600 ohms or greater—will not ring into any capacitive load
Nominal Output Level: +4dBm
Max. Output Level Before Clipping: greater than ±19 dBm, 20-20,000Hz

Frequency Response:
±0.25dB, 20-20,000Hz: EQ controls set at "0" detents

Available Gain:
+12dB; adjustable to −infinity by means of front-panel GAIN control

Slew Rate:
Varies between 6 and 13V/uS depending upon setting of GAIN control; slewing is symmetrical. Internal bandlimiting assures that slew rate limiting will not occur even with the most severe equalization and program material.

Square Wave Response:
Square wave exhibits no spurious ringing at any output level. The only ringing observable is that theoretically associated with any given equalization curve.

Total Harmonic Distortion:
Less than 0.05%, 20-20,000Hz (+18dBm)

SMPTE Intermodulation Distortion:
Less than 0.05% (+18dBm:60/7000Hz, 4:1)

Noise at Output:
Less than −75dBm (EQ in, filters out, controls centered)

Overload/Noise Ratio:
Better than 113dB for any single bandpass filter, for any settings of TUNING or BANDWIDTH controls.

Equalization Ranges:
±16dB peaking EQ, Reciprocal

Tuning Ranges:
20-60Hz; 40-150Hz; 110-310Hz; 230-750Hz; 480-1900Hz; 1.1-4.5Hz; 2.8-9.0kHz; 5.9-21.kHz. Dials calibrated at ISO preferred frequencies.

"Q" Range:
Greater than 0.5 to 10 for any setting of the TUNING control

Low Pass Filter Section:
Tunable in 2 ranges: 200-2000Hz or 2.0-20kHz, 12dB/octave, (2nd-order Butterworth)

High Pass Filter Section:
Tunable in 2 ranges: 20-200Hz or 200-2000Hz, 12dB/octave, (2nd-order Butterworth)

Overload Indicator:
Lamp lights for 200mS if the instantaneous peak output of any amplifier rises to within 1dB of its clipping point.

Circuit Design:
Active RC realized with FET-input opamps. Line driver employs discrete transistor current booster.

Operating Temperature:
0-50°C

Power Requirements
115/230VAC ± 10%; 50/60Hz; 6 watts

PHYSICAL

Operating Controls
EQUALIZATION, TUNING, and BANDWIDTH for each of eight bands. TUNING, RANGE (x1; x10), and FILTER IN/OUT for each filter. EQUALIZATION IN/OUT, POWER ON/OFF, and GAIN for entire equalizer.

Panel:
19" x 5¼" (48.3 x 13.3cm): 3 units

Chassis Depth Behind Panel:
5¼" (13.3cm)

Weight:
Net: 8 lbs. (3.6kg); Shipping: 12 lbs (5.4kg)

AC Cord:
3-wire U-ground to USA Standard

Connectors:
140 type barrier strip (#5 screw) plus parallel-wired ¼" 3 ckt. phone jacks (Switchcraft 12B or equal). Holes punched for XLR-type connectors (Switchcraft D3F and D3M or equal)

Circuit Ground:
Available on barrier strip; normally jumpered to chassis.

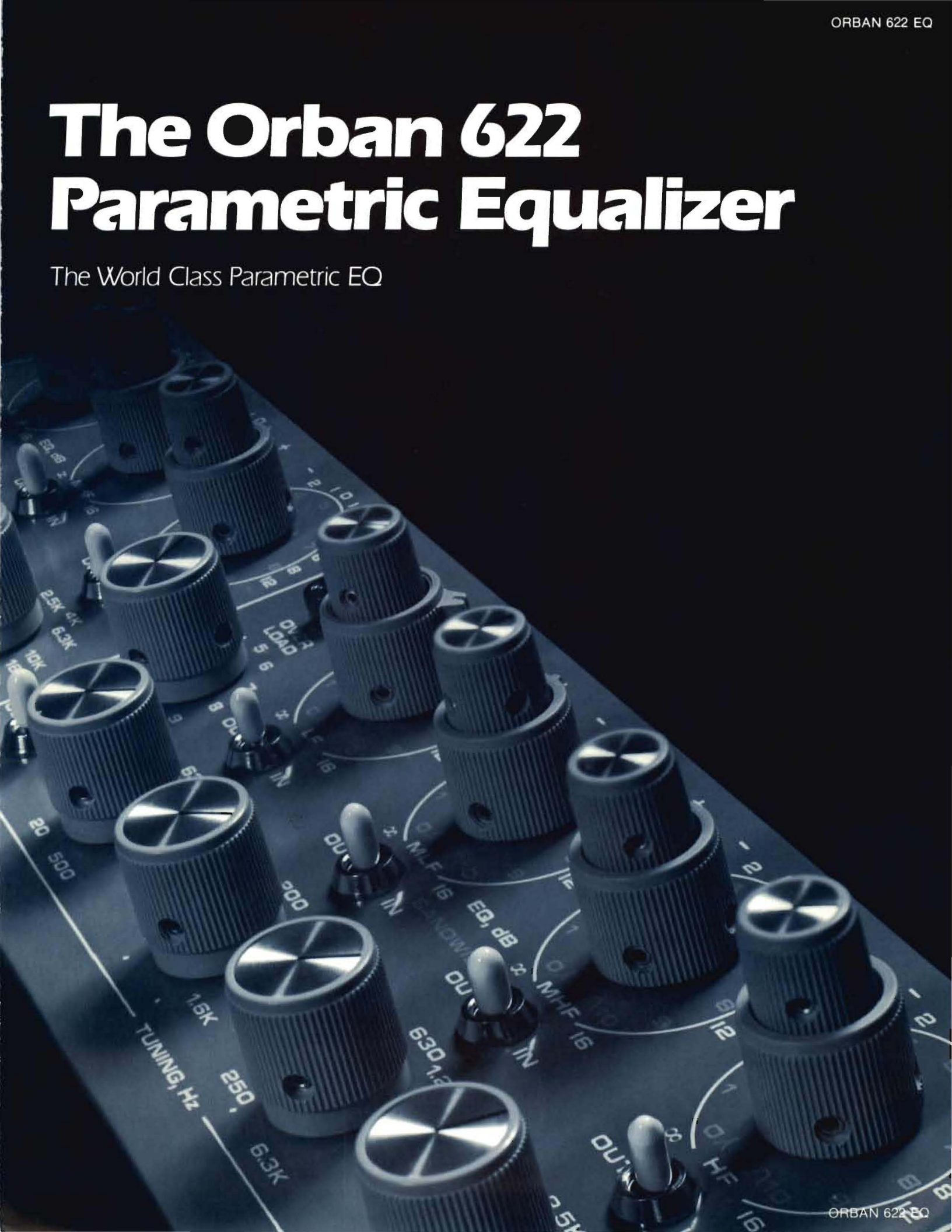
Specifications subject to change without notice.

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800007-000-05
2/81

The Orban 622 Parametric Equalizer

The World Class Parametric EQ



Performance Highlights

- +16dB, –infinity dB equalization range
- Each section tunes over 25:1 frequency range
- "Q" adjustable from 0.29 to 3.2
- "Constant-Q" operation enables use of equalizer as notch filter
- True Parametric operation: all controls non-interacting
- Four totally non-interacting peak boost/cut sections, each with TUNING and BANDWIDTH control
- Front panel GAIN control; 12dB gain available
- In/out switches for each section, as well as entire equalizer
- "Peak stretching" overload indicator warns of overload anywhere in equalizer
- Active balanced input; unbalanced output. Transformer-balanced output available
- Very low noise and distortion
- High slew rate for minimum TIM (SID)
- High stability active RC circuitry
- Single or dual-channel models
- RFI suppression of input, output, and power leads
- 115/230V 50-60 Hz AC power supply standard

The 622 Parametric Equalizer

Description

The Orban 622 is a true Parametric Equalizer of high professional quality, providing outstanding versatility and control. The four sections in each channel each use "constant-Q" circuitry. This results in an equalizer of outstanding musicality, and permits any section to be used as a narrow-band notch filter (with typically better than 40dB rejection) to effect room tuning or to eliminate fixed-pitch interference, like hum. The sections are totally non-interacting: the total equalization (in dB) is simply the sum of the equalizations of the individual sections.

Considerable attention has been devoted to human engineering, maintainability, and performance in the harsh environments often encountered by the professional user. Levels, impedances, and connectors are fully compatible with virtually all professional equipment. The rugged chassis provides shielding against electrical interference, RFI, and dust. Reliability is assured by a formal burn-in program and additional high temperature burn-in of most semiconductors.

Each feature of the 622 Parametric Equalizer has been thoughtfully chosen and implemented to make the equalizer a particularly powerful tool in nearly all areas of audio: sound reinforcement, public address, recording studio, broadcasting, motion picture sound, disco, theater . . .

Parametric Equalizers—An Explanation

In general, "Parametric" means anything an equalizer manufacturer chooses it to mean. The most commonly accepted definition is that a "Parametric" equalizer provides continuously variable control over the three fundamental *parameters* of equalization: the *amount* of peak or dip (in dB), the *frequency* (the "center frequency") at which the maximum peak (or dip) occurs, and the *bandwidth* (the number of frequencies on either side of the center frequency which are affected by the equalization.)

Bandwidth is a poorly defined parameter for equalizers. (In particular, it is *not*, as often stated, the ratio of the center frequency to the frequency at which the equalization is 3dB down — what if we're using only 2dB eq?!) The bandwidth is related to a more precisely defined factor called the "pole Q", or simply the "Q", for short. If this factor is kept constant as the EQ control is operated, then a curve family called "constant-Q" (see Fig. 1) is created. These curves are not reciprocal —the dip curves are narrower than the boost curves. Experience has shown that these curves produce a more musically-useful equalization with minimum readjustment of the BANDWIDTH control as the EQ control is operated. Moreover, unlike the more common reciprocal curves, they permit the creation of deep narrow-band notches which are highly useful for suppressing sounds of fixed pitch, with negligible degradation of the rest of the program.

There are two fundamentally different types of Parametric Equalizer. Orban manufactures both types. The 622 is a "true Parametric." This means that adjustment of a single parameter (like the center frequency) does not affect the other two parameters. This configuration is preferred when maximum convenience is desired. Conversely, a "quasi-Parametric" (like our 672A) permits some interaction (usually changing center frequency also changes "Q") to achieve lower cost. For more detailed information on these important but challenging subjects, please request our free paper "How To Choose Equalizers For Professional Applications" by Robert Orban.

Regardless of configuration, Parametric Equalizers are usually superior to other types when maximum control, flexibility, and freedom from undesired side-effects are desired. In using non-parametric equalizers, you must live with whatever bandwidth and whatever discrete center frequencies the manufacturer has chosen. And you don't have any control over how the bandwidth varies as you change EQ. In graphic equalizers, large boosts over a broad bandwidth often become excessively colored and ringy compared with the results obtainable from an optimally adjusted Parametric.



Applications

Sound Reinforcement
The 622 can often do a surprisingly effective job of "tuning" a sound reinforcement system to a room. The availability of four narrowband notches means that sharp resonances can be dealt with—often more effectively than with third-octave filter sets with fixed filter frequencies. While not designed to replace third-octave filters, the 622 can often augment their effectiveness and in many cases can make surprisingly substantial improvements all by itself. One useful variation is to use both equalizers in the 622B in series—one to notch out feedback and one to provide broadband equalization.

In large scale reinforcement systems for traveling shows, the Orban Parametric is highly useful in equalizing stage monitor systems. In bi-amped and tri-amped installations, the use of one channel of Parametric equalization after each output of the electronic crossover has proven to be of substantial value in optimizing the performance of the individual drivers in the loudspeaker system. Anywhere a conventional equalizer is used, the 622 can do the job better. If more complicated equalization is required, use several channels in cascade. The noise level is low enough to permit this.

Motion Picture Sound
The 622 is an ideal replacement for the graphic equalizer ordinarily used for dialogue equalization. The mixer gets finer control, plus the ability to instantly notch out the extraneous sounds that always seem to plague location recordings. In the music recording studio, the 622's improved adjustability means better sound in the theater. In production, use it for special effects like telephone or "old time" recordings.

Recording Studios
Every recording studio needs at least a few channels of Parametric equalization to handle the tough chores that the internal console equalizers can't deal with. Many experienced Orban Parametric users prefer to have one channel of Parametric equalization on each console input. With practice they're fast and easy to use, and the powerful features (like notching and fine-tuning are instantly available without patching).

The 622 is a particularly valuable adjunct to an electronic music synthesizer—you can create high "Q" formants and shape the spectrum so that the sound comes alive.

If you need to correct the equalization of a finished track because of second thoughts after the mix, the 622 can create the finishing touches as no ordinary equalizer can. It's better than even a third-octave graphic, because the 622 can create broad, non-ringing boosts—the graphic is much more colored and ringy.

Broadcasting
Use the 622 in the production studio to enhance the announce mike and to create special production effects that make your station stand out among its competitors. Meanwhile, another 622 can be quietly and efficiently equalizing the program line for maximum punch and brightness on the air.

Use the 622 to equalize phone and remote lines for flat response—it's much more versatile than the standard phone company equalizers. In the main studio, use it on the announce mike to equalize for maximum presence and also to notch out undesired sounds like mechanical hum from cart machine motors or air conditioning noise. Whatever your application, the 622's RFI suppression and optional balanced-output transformer mean trouble-free installation even in high-RF environments.

In Summary

Many people are now aware of the *power* of parametric equalization: the almost sensual satisfaction of getting the sound exactly *right*. These same people are also demanding professionals, insisting on inaudible noise and distortion, human engineering, quality "feel," and uncompromising reliability. We at Orban feel that there is no cheaper equalizer that delivers this full degree of professionalism, and no more expensive equalizer which provides an improvement in performance proportionate to its cost. Our 622 is also backed up by a company which is firmly established in the industry and is committed to service, stability, and responsiveness to customer needs. That's why our 622 is such a fine choice for any professional who needs an equalizer.

The 622 is available from your local Orban professional audio dealer. Call or write for the name of the dealer nearest you.

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Technical Description

The 622 Parametric Equalizer consists of a balanced input buffer amplifier, an input attenuator, and four peak/dip equalization sections connected in series, assuring no interaction between sections. The final section contains a current booster capable of driving 600 ohm loads. The output of the input buffer and each of the equalization sections is monitored at all times by the overload indicator. The EQ IN/OUT switch bypasses all circuitry but the input buffer and output amplifier; it is arranged so that gain and signal polarity are maintained constant in the IN and OUT modes.

Equalization is accomplished by summing the output of a two-pole bandpass filter to the main signal in-phase (for boost) or out-of-phase (for cut). This creates the "Constant-Q" curves described above.

As the BANDWIDTH control is operated, the skirts of the equalization curve move in and out but the peak gain remains constant (see Fig. 1). As the TUNING control is operated, the curves in Fig. 1 slide along the frequency axis but their shape is unchanged. If shelving characteristics are desired, they may be approximated by adjusting the lowest band to 20Hz and the highest band to 20kHz. The breakpoint of the shelving characteristic is then adjusted with the BANDWIDTH control.

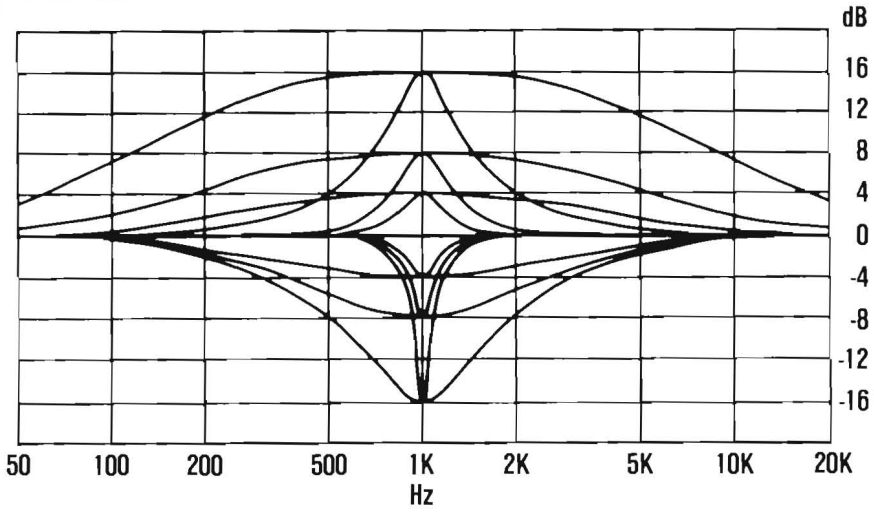


Figure 1

Performance Specifications

Specifications apply to each channel except as noted. All specifications apply when equalizer drives 600 ohm or higher impedances. All noise specifications assume a 20-20,000 Hz bandpass filter with 18 dB/octave Butterworth skirts.

Operating Controls: EQUALIZATION, EQUALIZATION IN/OUT, BANDWIDTH, and TUNING for each of four bands. MASTER EQUALIZATION IN/OUT, GAIN, POWER ON/OFF.
Frequency Response: (EQ controls set mechanically flat) ±0.25 dB, 20-20,000 Hz.
Available Gain: + 12 dB, adjustable to -∞ by means of front-panel GAIN control.
Input: (RF suppressed)
- Impedance: (each leg) 100K in parallel with 1000pF, electronically balanced. Driving impedance should be 600 ohms or less.
- Absolute Overload Point: + 26dBm.

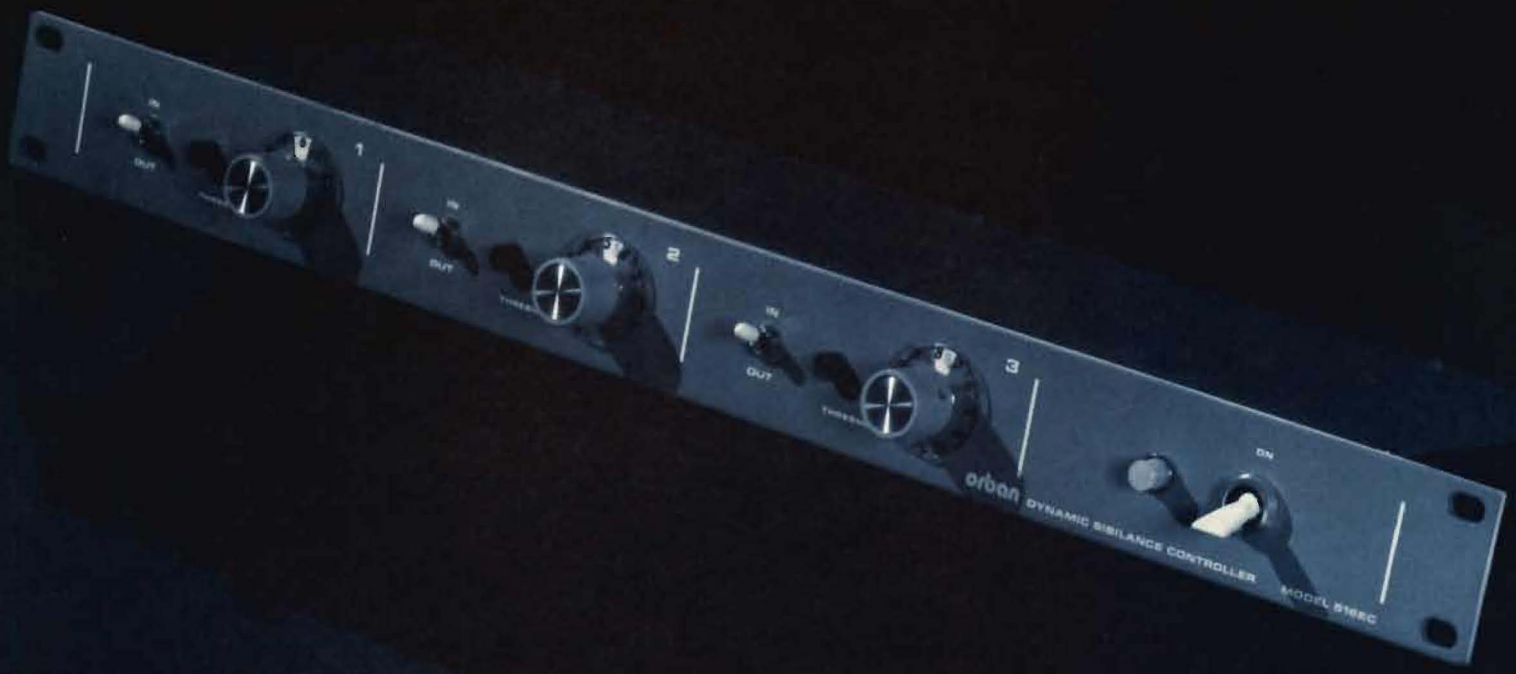
Output: (RF suppressed)
- Level: greater than + 19 dBm into 600 ohms, 20-20,000 Hz
- Impedance: 47 ohms in parallel with 1000pF, unbalanced. (Option 01 provides a transformer-balanced output for both channels)
- Equalizer is unconditionally stable and will not ring with any captive load.

Risetime: less than 4 microseconds.
Slew Rate: greater than 6 V/microsecond. Internal bandlimiting assures that slew rate limiting will not occur with even the most severe equalization and program material.
Square Wave Response: Square wave exhibits no spurious ringing at any output level. The only ringing observable is that theoretically associated with any given equalization curve.
Circuitry: active RC, utilizing FET-input IC opamps. The output line driver utilizes a discrete transistor current booster.
Total Harmonic Distortion (+ 18 dBm output): less than 0.025%, 20-20,000 Hz. Typically less than 0.002% at 1kHz, + 18 dBm.
SMPTE Intermodulation Distortion: Typically 0.008% at + 18 dBm equivalent peak output, using 60 Hz/7 kHz; 4:1.
Noise: At Output, GAIN control adjusted for unity gain, all EQ switches IN, all EQ controls FLAT: Less than -84 dBm; -87 dBm typical.
Overload-to-noise Ratio of Single Parametric Bandpass Filter: greater than 102 dB for any combination of TUNING and BANDWIDTH settings.
Interchannel Crosstalk, 622B dual-channel equalizer: less than -90 dB, 20-20,000 Hz.
Equalization Characteristics: Figure 1 shows curves corresponding to the maximum and minimum bandwidths for each band. DB equalization contributions of the individual bands add without interaction. BANDWIDTH, TUNING, and EQUALIZATION controls are all continuously variable.
Range of Adjustment of "Q": 0.29 to 3.2.
Range of Adjustment of Peak Equalization: + 16 dB to -∞ . Typical notch depth obtainable is 40 dB.
Tuning Range (per band): 20-500 Hz, 68-1700 Hz, 240-5850 Hz, 800-20,000 Hz. Tuning dials are calibrated at ISO preferred frequencies.
Power Requirements: 115/230 volt 50-60 Hz AC, approximately 4 watts (622A), 7 watts (622B). Captive "U-Ground" power cord. Option 02 eliminates the AC power supply. Power requirements for the Option 02 version are ± 18 to 28 volts DC at 60 ma per equalizer channel. Option 02 is supplied on special order only, and is recommended only for users planning to install a large number of 622 channels in a given installation.
Overload Lamp: will light for approximately 200 mS if the instantaneous peak output of any amplifier in the equalizer is driven within 1 dB of its clipping point.
Size: 19" (48.3 cm) wide x 3.5" (8.9 cm) high x 5.2" (13.3 cm) deep.
Shipping Weight: 10 lbs. (4.5 kg).

800013-000-04
3/80

The Orban 516EC Dynamic Sibilance Controller

Three channels of cost-effective de-essing



An old problem in the cinema industry

Requirements for automatic de-essing have existed in the sound recording industry ever since the movie industry found that compressing and equalizing dialogue introduced an unpleasant overemphasis of sibilants. In that industry, the inherent susceptibility of the optical sound track to high-frequency distortion makes sibilance control essential, and frequency-selective networks were introduced into the side-chains of dialogue compressors in order to deal with the problem.

And a new problem in the record industry

In the record industry, the sibilance problem arose in a different way. Producers found that a large boost at 5 kHz or above tends to greatly improve the subjective quality of many recorded singing voices. Simultaneously, large amounts of compression are supplied to the vocal in order to make the finished record sound louder and more "commercial." Unfortunately, these measures usually can't be utilized to their maximum benefit because they tend to boost sibilance levels grotesquely. In addition to being unpleasant to the ear, these sibilants cause overload and "splattering" on such disparate high-frequency-preemphasized media as disc, cassette and FM radio.

Many currently available de-essers have quality problems–such as excessive noise, excessive distortion, pumping, and/or difficulty of use–which make them acceptable for optical sound tracks but not for the highly quality-conscious record industry. Admittedly, there are certain compressors made for the record industry which have an add-on "de-ess" position. These compressors are at least marginally acceptable from the point of view of noise and distortion. However, these de-ess afterthoughts usually have excessively slow attack and release times, and most importantly, have control filters which are insufficiently selective to efficiently distinguish between sibilance and low frequency information. Appropriate compression slopes, attack times, and release times are very different for compression and de-ess functions, and a single compressor with a frequency-selective side-chain cannot satisfactorily perform both tasks simultaneously.

Enter the Orban 516EC

The Orban Dynamic Sibilance Controller Model 516EC is designed to provide the de-essing function **only** with quality commensurate with the highest quality contemporary studio electronics. It offers optimized attack and release times, strikingly good noise and distortion characteristics, simple operation and unusual economy. Because of its technically advanced solid state/IC design, it features high reliability and excellent long-term stability as well.

How it works

The basic de-ess function is provided by a limiter with a frequency-selective 18dB/octave filter in the side-chain. The threshold of limiting, instead of being fixed, is forced to track the average input level to the de-esser. In this way, no gain reduction occurs on the vocal components containing predominantly low frequency energy, yet sibilants (containing predominantly high frequency energy) cause gain reduction if they exceed a certain fraction of the average vocal level. This fraction is controlled by the front-panel THRESHOLD control. The amount of de-essing is therefore constant whether the voice is loud or soft. In practice, the input range for constant de-essing is about 15dB.

The Orban DSC controls sibilance by reducing the gain of the entire program. Attack and recovery times are chosen so that no pumping is audible. Certain competitive units operate by introducing a program-controlled lowpass filter. The difficulty with this approach is that excessive sibilance is often accompanied on the original track by excessive intermodulation distortion, causing low-frequency "grit." By lowpass filtering the track, the remaining low frequency distortion products can become distressingly audible. In contrast to this approach, the Orban DSC reduces the level of the distortion products as much as it reduces the sibilance.

Limitations

Two limitations should be observed in order to get the maximum benefit from the Orban DSC. First, the unit is effective on **vocal tracks only**, and does not give satisfactory results on tracks which have already been mixed. Second, because the unit uses frequencies of 6 kHz and above to control its action, it is not effective on material with limited frequency range which lacks these frequencies. A bandwidth of 8 kHz should be the minimum required for proper operation.

Technical features

The Orban Dynamic Sibilance Controller is supplied on a 1¾" x 19" (4.45 x 48.26 cm) rack panel containing three independent de-essing channels. Three people in a vocal group, for example, or the outputs of three magnetic dummies in a motion picture re-recording stage can be de-essed with independent control of thresholds and without interaction. Each channel has only two operating controls, making adjustment quick and effortless. An **In/out** switch activates the de-ess function without clicks, pops or gain changes, and a **threshold** control which establishes the high frequency level, relative to the average input level, at which gain reduction starts to occur. In addition, each channel is fitted with an LED which is illuminated whenever gain reduction occurs.

The Orban DSC is designed for use in a +4 dBm nominal line with 500 ohm or higher impedances. The input is unbalanced bridging, and the output will typically drive +21 dBm into 500 ohms or higher at the clipping point. Changing three resistors in the field can modify any channel for 10 dB gain with a nominal input level of -6 dBm, should the user wish to operate the unit at a lower-level patch point.

Ultimate user benefits

The Orban Dynamic Sibilance Controller provides an effective solution to a long-standing industry problem, and its availability enables the record industry to routinely use vocal track de-essing without worrying about unpleasant side effects. Good de-essing means that equalization can be used even more effectively and creatively than before, leading us one step closer to the "better than real life" sound toward which many contemporary producers strive.

A single-channel version of this product is available as Model 526A with mic/line level inputs, standard balanced input/output, and LED bar-graph indicators.

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SPECIFICATIONS:

Input Impedance: 5400 ohms, unbalanced.
Output Impedance: 47 ohms. Will drive 500 ohms or any higher impedance. Unbalanced. Short-circuit protected.
Gain (below de-essing threshold): 0 dB ± 1 dB. Can be modified to +10 dB in the field.
Output clipping point: +19 dBm minimum; +21 dBm typical into 600 ohms, 20-20,000 Hz.
Output noise: (measured on average-responding meter through 30-18,000 Hz bandpass filter with 6 dB/octave skirts): −80 dBm max; −86 dBm typical.
Dynamic Range: 107 dB typical.
Frequency Response (below de-essing threshold): ±0.5 dB 20-20,000 Hz.
Attack Time: 1 millisecond typical.
Release Time: 15 milliseconds typical.
Total Harmonic Distortion: Below 0.5% @ 18 dBm out into 600 ohms, 20-20,000 Hz.
Maximum Gain Reduction: capable of at least 25 dB gain reduction.
Input Level Range for Constant De-essing Action: 15 dB typical. Depends on setting of **threshold** control.
Number of Channels: Each 516EC contains three entirely independent de-essing channels.
Applicability: The 516EC is designed for use on **voice only**, not on composite program.
Controls: Threshold (each channel). In/out (each channel). AC power on/off.
Indicators: LED lights whenever de-essing is taking place (each channel) neon indicator for AC power.
Input/Output Connectors: Cinch-Jones 140-Y terminal strips.
Line Cord: 3-prong type to U.S. standards.
Power Requirements: 115/230 volts AC ±10%, 50-60 Hz, 7 watts.
Grounding: power line connected to chassis. Chassis and signal grounds may be separated by removing an internal jumper.
Mounting: Requires 1¾" of rack space in standard 19" relay rack.
Shipping Weight: 7 pounds (3.18 kg).

800004-000-05 5/81

The Orban 526A Dynamic Sibilance Controller

The single-channel de-ess specialist



Performance Highlights

- Effective, inaudible de-essing over a 15dB input range
- Accepts mike or line-level inputs
- Quick, easy adjustment and operation
- Transformer-balanced input and output with RF suppression

Description

The Orban 526A Dynamic Sibilance Controller is an improved, **single-channel** version of our well-known three-channel 516EC. The 516EC has become an industry standard, and is found in virtually every first-class international recording facility.

Like the 516EC, the 526A is designed to effectively de-ess **voice only** in recording studio, cinema, broadcast, and other professional applications. Compared to its competition, it offers vastly simpler setup, improved noise and distortion performance, and no emphasis of residual IM distortion while de-essing is occurring.

The 526A is transformer-balanced at both input and output, and features RF filtering of input, output, and power connections. This, combined with a built-in microphone preamplifier (a switchable pad matches it correctly to +4dBm line levels), makes it ideal for use by broadcasters and others whose facilities must operate in high RF fields.

The 526A is simplicity itself to operate. There are only two adjustments: a THRESHOLD control which determines the desired level of sibilance at the 526A's output and a GAIN control. The 526A's threshold is modulated by a circuit which tracks input level; thus, de-essing is constant over a wide range of input levels (typically 15dB). The IN/OUT switch can be operated at any time without clicks, pops, or gain changes. Critical parameters (such as attack time, release time, and the frequency characteristics of the control loop) have all been preset after extensive critical listening tests; these parameters need never be adjusted by an engineer who presumably has better things to do. Instead, the 526A is simply **there**—ready to be patched in to do its job **right**—without hassle or experimentation.

LED displays provide efficient monitoring of levels and control. A five-LED column provides a peak-reading display of output level, and makes setting the GAIN control easy. Two LED's (**normal**, and **heavy** gain reduction) give an accurate visual indication of the amount of de-essing which is occurring, and warn of misadjustment of the THRESHOLD control.

There are two significant limitations which must be understood to make most effective use of the 526A. First, it cannot usually be successfully used on voice which has already been mixed with other sounds, because it can mistake certain sounds with strong high frequency content for sibilance and cause "pumping." Second, the 526A uses frequencies of 6kHz and above to control its action. For proper operation, the minimum bandwidth required of the source material is therefore approximately 8kHz.

How It Works

The 526A de-esses by quickly reducing its gain when an "ess" exceeding the user-adjustable threshold is applied to its input. The variable-gain device is a junction FET, which assures a gentle overload characteristic and freedom from control voltage leakage into the signal. As soon as the "ess" overload vanishes, the gain recovers. The recovery is quick enough to assure that the following vocal sound is not affected. By reducing the gain of the **entire** channel (not just the high frequencies), any IM distortion caused by overload of the original recording medium is reduced along with the "ess."

"Esses" are detected by means of a sharply selective filter in the control feedback loop, which effectively discriminates between "ess" frequencies (centered around 6kHz) and lower-frequency vocal components. In addition, the threshold of the control voltage generator is automatically varied to correspond to the peak input level, thus assuring that the threshold is always a constant **fraction** of the input level, resulting in constant de-essing over a wide variation of input levels. Nonlinear control voltage smoothing assures that excessive modulation distortion will not occur under de-essing conditions despite the extremely fast (~ 10ms) release time employed.



- Peak-reading LED-column level display
- Dual-LED gain reduction metering
- Overload/noise ratio typically 105dB
- Very low distortion
- Constructed to high professional standards

Applications

Recording Studios

Current vocal equalization practices in the pop recording industry tend to include large amounts of high frequency boost to increase presence and articulation. These boosts, particularly when combined with limiting or compression, can boost sibilance to unpleasantly high levels. Using the 526A **after** the equalizer and limiter can reduce the sibilance to levels that sound natural and right. With the 526A, equalization and limiting are no longer constrained by the problems of unnatural sibilance levels, and may therefore safely be used to achieve the ultimate artistic goals of the producer and engineer.

Motion Picture Sound

The susceptibility of the variable-area optical soundtrack to high frequency cross-modulation distortion has resulted in a historical need for de-essing in this industry. The 526A can fulfill this need in a natural and inaudible way—with solid state reliability and with the fully balanced input/balanced output interface requirements characteristic of the larger motion picture sound recording installations.

Broadcasting

The extreme limiting and compression employed by many broadcasters in an effort to win audience may simultaneously result in a substantial increase in announcer sibilance. In addition, there are some "problem announcers" with naturally sibilant voices whose sibilance may be unacceptably exaggerated by even moderate audio processing and/or characteristics of announce microphones.

All these problems can be solved with the 526A. It can replace the console microphone preamp, and its output can be wired ahead of the microphone key on the console. Alternately, it can be used in a complete signal processing system for the voice chain, including equalization. Quality is far more than adequate to permit its input to be used as the "main microphone input" in a Proof of Performance (with de-essing defeated). And the extensive RFI protection means easy installation.

In Summary

Virtually everyone involved in professional sound needs de-essing. This probably means you. Either you must deal with at least one "problem voice" which requires de-essing to reach contemporary standards of recorded quality, or sibilance buildup problems have held you back in your quest to transcend the merely adequate and achieve the truly excellent.

If you recognize either problem, then the Orban 526A is your ideal solution. It's clean. . . it's quiet. . . and it's **simple**. It's a problem **solver**, not a problem **generator**. See your Orban dealer about the De-Ess Specialist.

A three-channel version of this product, the Model 516EC, is available which has unbalanced inputs and outputs.



Specifications:

Electrical

Input: (switchable for mic or line)
Load Impedance—Mic: greater than 1K ohms, balanced bridging (for 200 ohm microphones)
—Line: 10K ohms, balanced bridging
Nominal Level—Mic: – 60 to – 35dBm
—Line: – 20 to + 4dBm
(Feedback-type gain control optimizes overload/noise ratio for different input levels)

Output:
Source Impedance: 600 ohms, transformer-balanced and floating
Clipping Level: exceeds + 20dBm into 600 ohms, 20-20,000Hz

Frequency Response:
± 1dB, 20-20,000Hz (below threshold of de-essing)

Maximum Voltage Gain:
Mic: + 56dB; Line: + 22dB

Input Level Range for Constant De-essing:
>15dB

Total Harmonic Distortion:
De-essing defeated: <0.1%, 30-20,000Hz @ + 18dBm
De-essing in: <0.5% @ 6kHz

Noise at Output:
Less than – 80dBm; – 85dBm typ. (20kHz bandwidth, unity gain through line input)

Attack Time:
Approximately 1ms

Recovery Time:
Approximately 10ms

Variable Gain Element:
Junction field-effect transistor

Indicators:
De-essing: 2 element LED array Output Level: 5 element LED array (full-wave, peak-reading, 5ms attack time)

Operating Temperature:
0-50° C

Power Requirements:
115/230VAC ± 10%; 50/60Hz; 8 watts

Physical

Panel:
19" x 1¾" (48.3 x 4.4cm): 1 unit

Chassis Depth Behind Panel:
5¼" (13.3cm)

AC Cord:
3-wire U-ground to USA standard

Connectors:
140-type barrier strip (#5 screw). Input is parallel-wired to female XLR-type connector. A hole is punched for an XLR-type output connector (Switchcraft D3M or equal)

Weight:
Net: 4.5 lbs. (2.1 kg)
Shipping: 6 lbs. (2.7 kg)

All specifications are typical unless otherwise indicated, and are subject to change without notice.

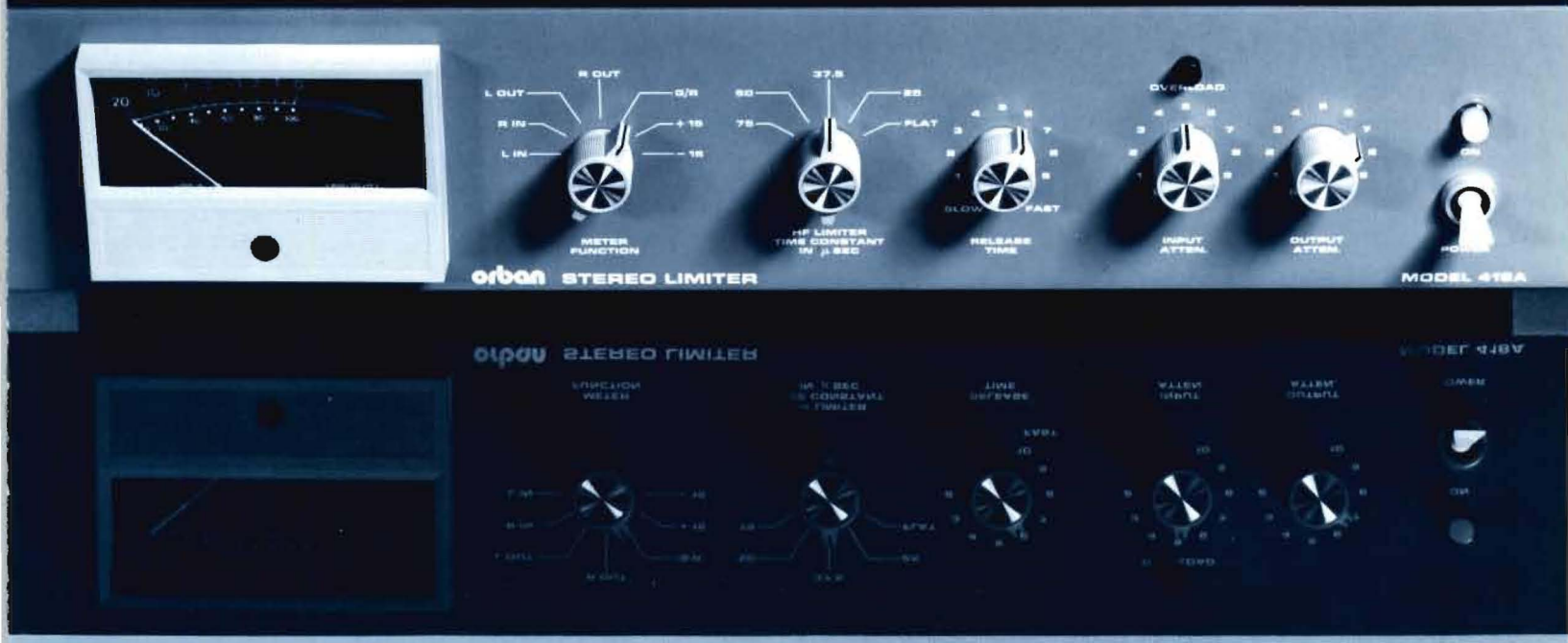
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800009-000-03
9/81

The Orban 418A Stereo Limiter/ Compressor

Straight-forward processing for the production room



With the huge variety of limiters, compressors, AGC's, compressor/limiters, and the like already available, it would seem that the best advice to be given to a manufacturer who introduces yet another one is to seek immediate psychiatric assistance. Nevertheless, surface appearances can be deceiving. It struck us that there was a place in the market for a unique AGC device which had all these attributes:

(1) **Program-controlled attack and release times** which would enable the device to work extremely subtly with all types of program material without the necessity for critical manual adjustment;

(2) **A high-frequency limiter with several user-selectable time constants,** enabling the high-frequency limiting action to be conveniently optimized for different recording media;

(3) **Two stereo-ganged channels** with excellent tracking which is stable over time and temperature without readjustment; and

(4) **A simple and "friendly" control configuration,** permitting the device to be used rapidly and efficiently in high-pressure, "real-world" situations.

The 418A is a complete limiting system consisting of a pair of ganged broadband compressor/limiters with exceptionally smooth and subtle characteristics, followed by a high frequency limiter with four different time constants, user selectable by means of a front-panel switch. This variable time constant feature is unique in the industry, and permits the characteristics of the high-frequency limiter to be tailored to the recording medium following the limiter, such as disc, optical film, cassette, or 7.5 ips tape.

Features

The time-saving features of the 418A complement its intended application: there are only four adjustments—INPUT LEVEL, OUTPUT LEVEL, RELEASE TIME, and TIME CONSTANT. The last determines the degree of high frequency control obtained. The RELEASE TIME control is not a simple release time control in the classic sense, but rather scales the release speed of the internal multiple-time-constant release time circuit faster or slower. This circuit incorporates four time constants to automatically tailor the release time to the program material, thus relieving the engineer of the task of determining a (usually compromise) single release time for each given piece of program material.

If the engineer wishes to make the recording "denser" (increase the apparent loudness for a given peak level), he can operate with a faster setting of the RELEASE TIME control, as well as large amounts of gain reduction. If he wishes a more natural, uncompressed sound, he will try to avoid using too much gain reduction, and will operate the RELEASE TIME in its slow position. Regardless of the setting of this control, the limiter is remarkably immune to classic limiter problems like pumping, or having heavy transients punch holes in the audio.

In the beginning . . .

The FM broadcast signal processing market has literally been turned upside down by the ORBAN OPTIMOD-FM. Less than two years after its introduction, its acceptance by major networks, groups, and prestigious independents has been remarkable.

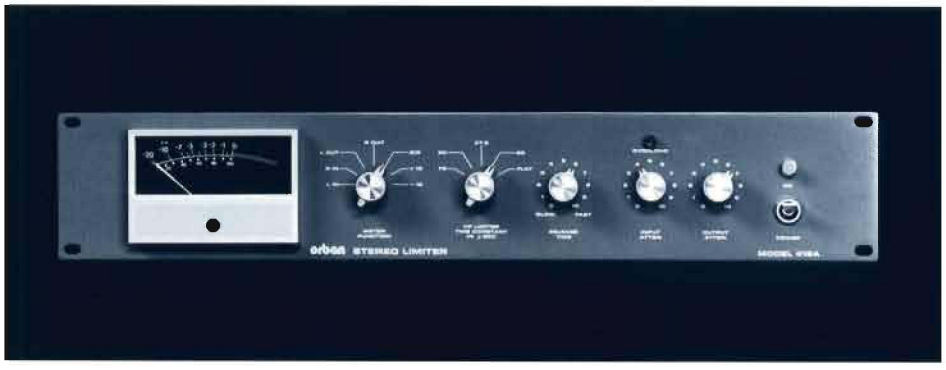
The results of the seven years of research that engendered the OPTIMOD-FM are almost directly applicable to any other recording and transmission medium which utilizes pre-emphasis and which can be clipped without damage to the medium. Examples include tape recording in studios and broadcast stations, cassette duplication, and optical film recording. We have adapted the OPTIMOD-FM research to produce the 418A: the epitome of signal control for these applications, at significantly lower cost.

The 418A, of course, is not suited for driving broadcast transmitters. While it is possible to put it in the program line provided substantial RF fields are not present, the user doing so will find that his loudness is anywhere from 6 to 8 dB lower than the loudness provided by the OPTIMOD-FM, given equal peak modulation levels. We therefore strongly urge the use of the OPTIMOD-FM, which combines the natural sound of the 418A with highly effective control of fast-peak modulation, in this particular application.

Applications

The 418A is incredibly clean, subtle, and natural, which makes it an ideal signal-processing device for any application where the user wants to preserve the essential character of the input sound, while effectively controlling broadband levels and excessive high-frequency energy. And, unlike certain devices we could name, the 418A has a minimum number of operating controls. Most decisions are made for the operator on the basis of an automatic analysis of the input program. This makes the 418A an outstanding time-saver, particularly suitable for expediting rough mixes, broadcast production, commercials, and the like. The high-frequency limiter controls equalization errors on the part of the mixer, and automatically conditions the signal so that it can be recorded on its final medium without high-frequency distortion. And the program-controlled time constants permit the 418A to do very substantial "gain-riding" without audible side-effects.

Broadcast Transmission: The 418A is also useful in providing AGC at the studio end of an STL (phone line or microwave) to prevent STL overload. It's particularly ideal for use with an OPTIMOD-FM 8000A, since the compression function provided by the 8000A can be provided instead by the 418A. The 8000A is then adjusted to act only as a safety



limiter to preserve the open, transparent OPTIMOD-FM sound. The simplicity of the controls means simple, hassle-free operation in any application. Yet the experienced engineer can use the RELEASE TIME and INPUT ATTEN controls to increase density and average levels as desired.

Broadcast Production: In stations employing reel-to-reel or cartridge tape as the principal program source, discs are often "sweetened" in the transfer to tape. This "sweetening" often consists of a slight boost in the mid-bass and a more substantial boost in the upper midrange. This latter boost can interact with the high-frequency pre-emphasis inherent in 7.5 ips (19 cm/sec) tape recording to produce nasty distortion. Use of the 418A with 50 or 37.5 microsecond high-frequency limiting can eliminate this problem with minimal audible effect upon the brightness of the tape.

In addition, the quality and efficiency of production of station promos, spots, and other live-mike/recorded production can be augmented by intelligent use of the 418A.

Recording Studio: The most obvious recording application of the 418A is as a "mixdown machine," saving time by gain riding and controlling high-frequency energy. However, the naturalness of the 418A also lends itself to single-channel limiting chores—particularly the traditionally difficult ones like limiting chorus, french horn, or piano.

Even mixes intended for record masters (where time is available to mix without the aid of a limiter) can profitably employ the 418A. If the 418A is used at, or below the threshold of broadband limiting, no gain-riding will occur. However, the high-frequency limiter will still operate as necessary. This permits the use of brighter equalization than would otherwise be practical. If vocal sibilance is controlled by use of an Orban 516EC Dynamic Sibilance Controller on the vocal track alone, the resulting mix can have much more "snap" or "sparkle" than would be possible by manual mixing alone.

Specifications (applicable to each channel)

INPUT:

Impedance: 150 k ohms balanced; active differential input.

Level: −10 dBm produces 10 dB gain reduction with INPUT ATTENUATOR fully clockwise. Absolute input overload occurs at +21 dBm.

OUTPUT:

Impedance: less than 400 ohms, unbalanced.

Level: +4 dBm nominal with OUTPUT ATTENUATOR full clockwise. Peak level approximately +12 dBm

FREQUENCY RESPONSE:

±0.5 dB, 20-20,000 Hz below high-frequency limiter threshold.

HIGH-FREQUENCY LIMITER:

Controls high-frequency peaks attempting to exceed a threshold defined by a single-time-constant rolloff of 75, 50, 37.5, or 25 microseconds, ±3%. Rolloffs are switch selectable from front panel, and high-frequency limiter is defeated in "flat" position.

Attack Time: approximately 3 milliseconds.

Release Time: varies around 15 milliseconds according to program history.

Control Element: junction field-effect transistor

BROADBAND LIMITER:

Attack Time: 1 to 2 milliseconds.

Release Time: Program-controlled by means of quadruple time-constant release time analog processor. Release time may be scaled fast or slow by means of continuously variable RELEASE TIME control available to user.

Range of Gain Reduction: greater than 15 dB.

Compression Ratio: in excess of 200:1

Interchannel Tracking: ±1.5 dB max; ±1 dB typ.

Control Element: junction field-effect transistor

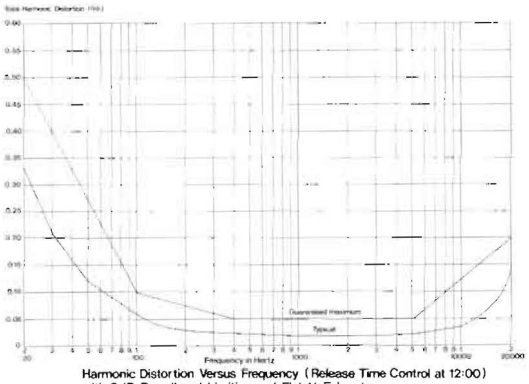
SEPARATION:

50 dB or better, 20-20,000 Hz

NOISE (dB below limiting threshold at 100 Hz; 20-20,000 Hz bandwidth):

−80 dB typ.; −75 dB max.

TOTAL HARMONIC DISTORTION: (See graph)



Harmonic Distortion Versus Frequency (Release Time Control at 12:00) with 5dB Broadband Limiting and Flat H-F Limiter

OPERATING CONTROLS:

OUTPUT ATTENUATOR (left and right ganged)

INPUT ATTENUATOR (left and right ganged)

RELEASE TIME

H-F LIMITER TIME CONSTANT

75 us; 50 us; 37.5 us; 25 us; flat

METER SELECTOR

left input; right input; left output; right output; gain reduction; +15 volt power supply; −15 volt power supply

AC LINE OFF/ON

INDICATORS:

AC POWER PILOT LAMP

OVERLOAD (lights if attempt is made to exceed possible broadband AGC range)

METER (3.5" (8.9 cm) with VU "A" scale and characteristics)

POWER REQUIREMENT

115/230 VAC ±10%; 50-60 Hz, approximately 6 watts. U-ground power cord attached.

DIMENSIONS:

19" (48.3 cm) wide x 3.5" (8.9 cm) high x 10" (25.4 cm) deep.

OPERATING TEMPERATURE RANGE:

0-50° C.

WARRANTY:

1 year, parts and labor. Subject to limitations set forth in our standard warranty agreement.

In preparing reference cassettes for artists and producers, the 418A can control high-frequency energy so that no audible high-frequency distortion is produced—even from bright mixes on 15 or 30 ips reel-to-reel tape. The simplicity of the operating controls of the 418A makes this extemely fast—and therefore economically practical.

If the 75 microsecond time constant is used with the high-frequency limiter, considerable broadband compression is employed, and small monitor speakers are used, the producer and artist can check the sound of a mix as broadcast over FM radio utilizing state-of-the-art processing equipment.

Cassette Duplicator: The 418A can effectively attack the two main problems of the cassette duplicator: high-frequency distortion and inadequate signal-to-noise ratio. The 75 microsecond time constant is ideal for cassette processing, and 4 or 5 dB of fast peak limiting can typically be employed without significant audible side-effects to improve cassette signal-to-noise ratio. Dolby-B processing may be employed after the 418A if desired.

Optical Film Recording: The extreme pre-emphasis employed by optical sound recorders in production of 35mm and 16mm tracks requires careful control of high frequencies in order to avoid severe distortion due to galvanometer shutter clashing and/or less than perfect cross-modulation control in printing. While this control has traditionally been performed manually by careful equalization in the mixing stage, use of the 418A in the magnetic-to-optical transfer chain permits equalization for greater brightness without risk of serious distortion, as high-frequency content can be controlled by the 418's high-frequency limiter utilizing a 75 microsecond time constant.

Specsmanship

More than any other electronic signal-processing device we know of, the sound quality of a limiter is not describable by means of the traditional specifications. The specs for the 418A are included here. While they are outstanding by any standards, they really don't mean very much when one attempts to correlate them to the **listening quality** of the system. A limiter must be evaluated **by ear.** This is because its quality is determined almost entirely by its **dynamics,** how the gain **changes** when the input of the limiter is excited by complex audio material. A limiter can exhibit extremely low noise and distortion and seemingly reasonable attack and release times, yet be unlistenable because its "action" is painfully audible.

The analog release-time processor in the 418A is an extremely sophisticated and relatively complex circuit. It employs four time constants, as well as non-linear smoothing of the gain-control voltage. The result, paradoxically, is an extremely subtle characteristic which is matched psychoacoustically to the ear with unprecedented accuracy. Yet its performance cannot be expressed in terms of numbers, other than to observe that the non-linear smoothing reduces steady-state harmonic distortion to truly negligible amounts.

Attack times and applicability

The attack times of the broadband AGC and high-frequency limiter sections of the 418A are on the order of several milliseconds. Therefore, the output contains considerable overshoot. The attack times have been adjusted by means of extensive listening tests so that any overshoot produced may be hard-clipped without audible side effects. This makes the 418A suitable for any medium which can clip naturally without damage or other unacceptable effects. Examples include tape and optical film. In a disc mastering situation, the 418A's high frequency limiter will protect the cutter from thermal overload. However, overcutting or excessive acceleration due to fast-rising transients may still occur.

It should be noted that limiters which offer extremely fast (say 10 microsecond) attack times reduce gain for many milliseconds on microsecond-wide peaks. The resulting "holes" in the output are far more objectionable than clipping of overshoots could possibly be.

About RMS detection: The Great Shuck?

Several manufacturers are currently using RMS detection in their compressors and limiters. It is claimed that the RMS value corresponds to the loudness of the sound, and therefore RMS detection controls loudness more accurately than other methods of detection.

The fact is that the RMS value of a sound has almost nothing to do with its loudness, which is vastly more complicated, being a weighted function of the spectral distribution among the "critical bands" of frequency, with further weighting related to the duration of the sound in question. To correlate RMS with loudness is not correct.

RMS detection has only one advantage: it is insensitive to the phase relationships between the partials of a steady-state sound, responding to the total power instead. The ear is very insensitive to phase; thus one parameter of the ear is stimulated. However, since the purpose of AGC is often to accommodate a sound to the peak level that a recording channel can handle without audible distortion, this "advantage" can quickly turn into a liability, because RMS detection, by definition, ignores the actual peak levels in favor of the power.

The 418A uses "slewrate limited peak detectors" in both broadband AGC and high frequency limiters to determine the amount of control. These peak detectors ignore very fast peaks, producing more and more control as the duration of the peak increases. As we said above, the proof is in the listening.

Life on the bottom line

"How does the 418A affect profits on my bottom line?"

We can't answer that question for you, but we could suggest that the ability of the 418A to save you and your customers time and money, as well as producing better product should certainly be financially advantageous.

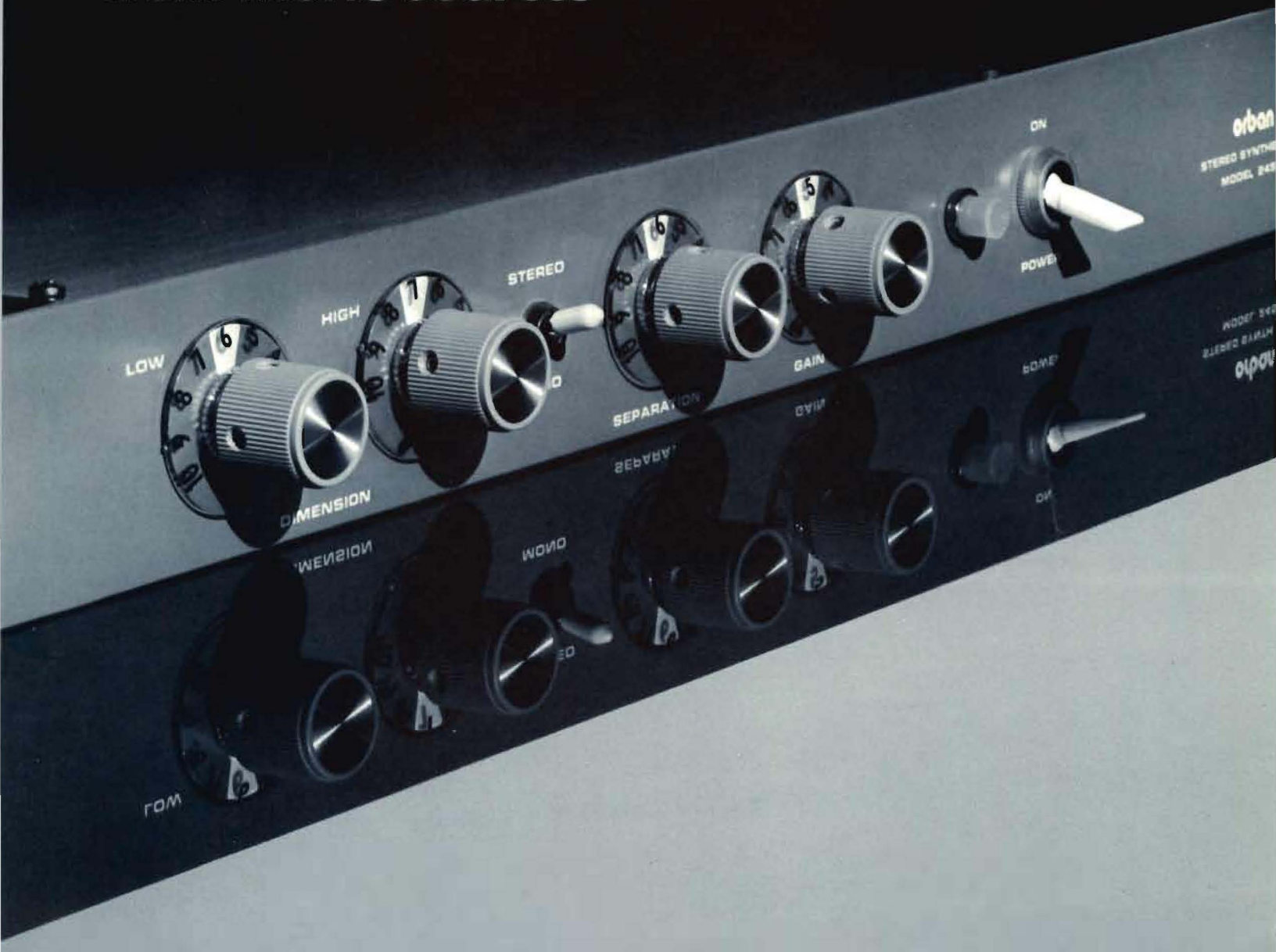
In addition, the 418A is an Orban product. That means industrial-quality construction, high reliability, first-class engineering, fast (and reasonable cost) service, and a one-year warranty.

orban

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The Orban 245E Stereo Synthesizer

Convincing pseudo-stereo from mono sources



Performance Highlights

- ☐Creates a convincing pseudo-stereo effect from any mono source
- ☐Total mono/stereo compatability for FM broadcast applications
- ☐Patented design offers seductive space and depth enhancement
- ☐Saves tracks in multi-track recording situations
- ☐Allows for stereo cart transfers with no phasing problems
- ☐Creates special effects by continually varying controls
- ☐Simple and easy-to-use

Description

The Orban Model 245E Stereo Synthesizer has been designed to take any mono signal and create lifelike pseudo-stereo. Unlike many other techniques, the patented Orban stereo synthesis technique causes no change in spectral balance, does not blur the transient definition, and adds not the slightest audible noise or distortion to the mono original. The stereo output sums back to the original mono for total mono/stereo compatability. And the simple controls adjust in seconds to create an optimum stereo effect from any mono original.

How it works

The Orban Stereo Synthesizer creates a stereo effect by dividing the mono source signal into five frequency bands. Three of these bands are placed in one stereo output channel; the remaining two are placed in the other channel. The filters are synthesized so that the sum of the two output channels is identical to the mono input. In addition, the sum of the powers in the left and right output channels is equal to the power in the mono input signal, guaranteeing that the stereo will have the same perceived frequency balance as the mono source.

The bandcenters and bandwidths of the midrange bands are adjustable by means of two **dimension** controls, one controlling lower midrange and the other controlling upper midrange. These controls act like frequency-band panpots, and are used to get good left-right channel balance for a given piece of mono source material. With practice, adjustment takes no more than five or ten seconds for a given mono source.

Also provided is a **separation** control which adjusts the level of the stereo difference signal anywhere from zero to the same level as the sum signal. The control is useful for adjusting the audible separation, and also controls the vertical component on a stereo disc or the subchannel modulation (and therefore the stereo and mono loudness) in FM stereo broadcasting. All controls can be adjusted freely throughout their range without fear of losing stereo/mono compatability.

Recording studio applications: reissuing old mono material

The most obvious application for the Orban Stereo Synthesizer in the recording studio is the reissuing of old mono masters in pseudo-stereo. Because of mono compatability, this can be done without offending those purists who have been turned off by some of the more bizarre and tasteless pseudo-stereo efforts of the past.

In cutting discs from mono masters, there is no need to go through an added tape generation—the disc can be cut directly through the Stereo Synthesizer. A second Stereo Synthesizer for the preview channel is ordinarily called for, but the lowered cost of the Model 245E makes this economically practical.

Dimensionally spreading single tracks in multi-track mixdowns

No matter how many tracks are available on a multi-track recorder, there never seem to be enough. And the first thing to be sacrificed is usually stereo recording of material like drums, strings and horns. All is not lost—mono tracks can be spread in space in the mixdown through the use of the Stereo Synthesizer. Electric or electronic instruments like synthesizer, guitar and organ can be given a sense of space and depth. And the mono input of an echo chamber or artificial reverb generator can be spread in a lifelike way.

Phasing and filtering effects

By taking only one input of the Stereo Synthesizer, and constantly varying the dimension controls, a "phasing" or "flanging" effect is obtained. A single output can also be used for other special filter effects.

FM broadcast applications: reducing stereo cart phase cancellation

Ever since the advent of the stereo tape cartridge machine, FM stereo broadcasters have been plagued with mono signal degredation due to phase shifts between the two stereo channels. The Orban Stereo Synthesizer can greatly alleviate this problem.

The phase cancellation problem arises because there are usually several frequencies in the high-frequency audio band where the left and right outputs from the stereo cart machine are 180° (or odd multiples thereof) out of phase. At these frequencies, material having equal level on the left and right channels will totally cancel, and at frequencies close to the 180° frequencies, the mono sum will be greatly attenuated.

Because of its filters, the Stereo Synthesizer places most frequencies on the left and right channels with unequal levels. Therefore, even at frequencies where the cart machine is 180° out of phase, cancellation is greatly reduced and the mono sound is notably improved.

The 245E can either be used at the output of a mono cart machine to create a pseudo-stereo effect, or it can be used when transferring material to a stereo cart to reduce phase cancellation due to cart phase problems. In either case, the result is a convincing pseudo-stereo effect with no mono signal degradation.

Stereoizing old mono material, announce mikes, etc.

The Stereo Synthesizer is an ideal way to create a "total stereo" format that includes old LP's, "golden oldies" 45's, and commercials. This material can be recorded on automation tapes without danger of mono phase cancellation. And DJ announcements, live or recorded, can be processed, eliminating the gross inconvenience of stereo-miking the announcer.

Installation

The 245E Stereo Synthesizer mounts in a standard 19" rack and requires 1¾" of space. Input and outputs are unbalanced and appear on barrier strips on the rear apron of the chassis. A 115/230 volt 50-60 Hz power transformer is standard. Up to 9 dB of gain is available, and internal noise levels are so low that the 245E can be operated in either line-level or medium level circuits without modification.

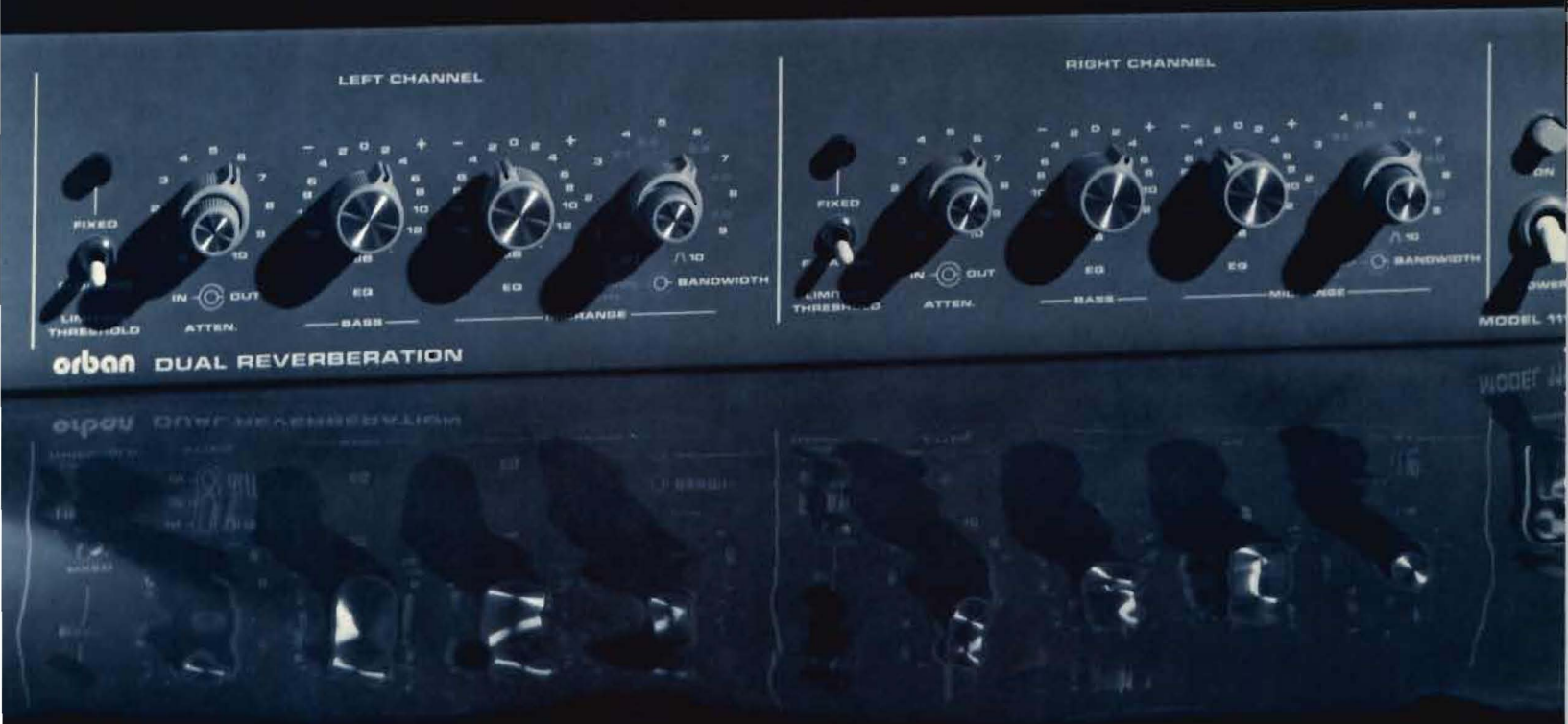
orban
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SPECIFICATIONS:

Frequency response of the stereo sum signal (re mono input): ± 1 dB, 20-20,000 Hz.
Frequency response of the sum of the stereo powers (re mono input power): ± 1 dB, 20-20,000 Hz.
Total Harmonic Distortion, + 19 dBm, 20-20,000 Hz: 0.3% max; less than 0.1% typical.
Noise (unweighted, 30-18,000 Hz): − 78 dBm max; − 80 dBm typical
Available gain: 9 dB
Input: 25,000 ohms unbalanced bridging.
Output: 1 ohm unbalanced. Will drive + 21 dBm typical (+ 19 dBm minimum, 20-20,000 Hz) into 500 ohms or higher load impedance. Short-circuit protected
Input/Output Connector: 140-Y barrier strip
Power Requirements: 115-230 volt 50-60 Hz AC, ± 10%, 2 watts. Supplied with "U-ground" 3-conductor plug to United States standards.
Mounting: requires 1¾" of vertical space in a standard 19" rack
Shipping weight: 7 pounds

The Orban 111B Dual Spring Reverb

The Reverb Industry's Price/Performance Leader



The Reverb With Breeding

The 111B Dual Reverb has a distinguished pedigree. Since 1970, hundreds of its ancestors have found their way into recording studios, schools and colleges, electronic music studios, radio stations, traveling shows, and sound reinforcement systems. At the time of its introduction, the first Orban reverb established new standards for price/performance in the artificial reverb field. Since then, user feedback and manufacturing experience have enabled us to continuously refine the product, resulting in reverbs with excellent sound quality, easy installation and an outstanding reliability record.

The 111B is our latest purebred generation. By offering two channels of reverb in a single package that combines both electronics and spring delay lines, we have succeeded in creating a reverb that combines full Orban quality and reliability with significant advances in cost-effectiveness. It's the only choice for anyone needing two channels of fully professional reverb in an economical package.

Features

We have retained all the desirable electronic features of our earlier models and added useful new equalization facilities.

- LOW FLUTTER is assured by the use of six springs per channel. Compared to the low-priced, consumer-grade competition, the sound is much smoother and better integrated.
- SIGNAL-TO-NOISE ratio is optimized by the use of a special low-noise IC preamp, by added mu-metal hum shielding around the spring pickup coils, and by a specially designed limiter circuit which allows the user to utilize the full headroom available in the system without concern for potential overload and distortion. The result: the effective signal-to-noise ratio of the 111B can be more than 6dB better than some of the high-prices competition.
- "TWANG" AND "BOING" NOISES are greatly reduced by this exclusive limiter when operated in the "floating threshold" mode. This circuit serves to eliminate sudden, sharp changes in level regardless of average level. By exploiting the "masking effect" (which lets the direct sound hide the residual "twangs"), even percussion and guitar can be reverberated without unnatural effects.

Evaluating a reverb by listening to the echo return alone is essentially meaningless—because reverb is almost never used in this mode. In fact, it is **essential** to evaluate the reverb in a real-world situation (with direct sound mixed in) to perceive the subtle psychoacoustical interaction between the direct sound and the reverb. You will find that the reverberation generator that sounds best when listened to alone may give a totally different impression when direct sound is mixed in. This is because the direct sound may mask that part of the reverb which gives the best "independent" impression, while the reverb decay (which is not masked by the direct sound) suddenly seems much more important.



The 111B was designed with the psychoacoustical interaction between direct and reverberated sound always in mind. Therefore, DECAY VERSUS FREQUENCY does not drop abruptly at high frequencies, unlike some of the high-priced competition. When others tout their naturalness on percussion, watch out—too often, this is achieved at the expense of excessive high frequency damping which gives the highly-audible reverb decay a dull, brassy sound. Because this characteristic is time-varying, it is **not** correctable with fixed equalization.

On the other hand, the 111B's longer high frequency decay results in the bright sound that most pop music demands. In fact, it's the closest you can get to the high-priced "plate" reverb sound in a low-priced reverb. Compare on vocals...strings... guitar...brass. We think that the cost-effective 111B more than stands up to the higher-priced compact spring reverbs on the market.

• FREQUENCY RESPONSE is optimized by means of elaborate fixed equalization in the reverb circuitry. In addition, a bass control and a quasi-parametric midrange equalizer permit the user to tailor the sound to his exact requirements. The versatile midrange equalizer permits continuously variable adjustment of the **frequency** of maximum equalization (1.5 to 5.5 kHz), the **amount** of equalization (up to ± 12dB), and the **bandwidth** (Q's from 0.5 to 5.0). We call it "quasi-parametric because operating the **tuning** control causes the bandwidth to change (unlike our full parametric equalizer, in which the controls are totally non-interacting).

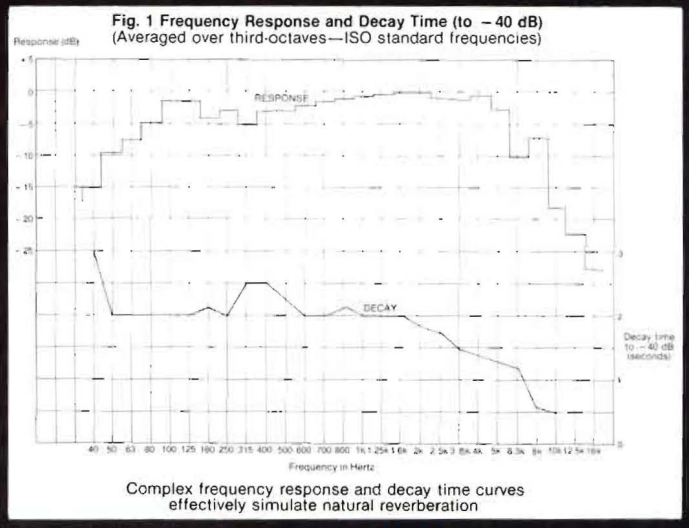


Fig. 1 Frequency Response and Decay Time (to −40 dB)
(Averaged over third-octaves—ISO standard frequencies)

Complex frequency response and decay time curves effectively simulate natural reverberation

Installation and Applications

The versatility of the quasi-parametric midrange equalizer complements the simple, inflexible equalization found on many low-cost mixers, and permits the owners of such systems to get the exact reverb sound they want. In addition, the 111B has very high basic input sensitivity (−30dBm), and a front-panel input gain control makes it usable with all mixers—even those with unusually low level sends.

This versatility is complemented by a fully-professional 0 dBm balanced, floating output. This arrangement vastly improves immunity to RF interference, and assures easy integration into any system without introducing ground loops and hum.



Because the spring delay lines are located in the same chassis as the electronics it may be inconvenient to install the reverb away from hum fields. Therefore, considerable attention has been given to hum-shielding the 111B. The spring pick-up coils are protected with added mu-metal shields and the steel case of the 111B provides increased protection.

The 111B includes its own AC power supply, and features a 115/230 volt 50-60 Hz power transformer, making it at home anywhere in the world.

If the Model 111B is used with a recording studio-type mixing console, it is connected to the echo send and echo return busses in the customary manner. For users who wish to use the 111B without such a console, an auxiliary output containing a mixture of direct sound and reverberated sound is available. The amount of reverberated sound is adjustable with the front panel Output Atten control.

Warranty and Service

Orban's use of top quality parts, industrial-quality construction, and special test and burn-in procedures make it highly unlikely that a user will ever experience any trouble with a 111B reverb. However, it's nice to know that the 111B is protected by a one-year parts and labor warranty, and that Orban is well-known for its fast, reasonable-cost service. Installation and "in-house" troubleshooting are made easy by an outstanding instruction manual which includes detailed installation instructions, performance verification tests, circuit description, troubleshooting hints, alignment instructions, and schematic diagram, as well as the user operator's instructions.

When shopping for a reverb, always consider parts quality, workmanship, reliability, warranty, service, and manual in addition to the obvious features. While the Orban 111B's features are outstanding, its true value lies in assuring **all** aspects of owner satisfaction. Compare before you buy.

orban

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SPECIFICATIONS

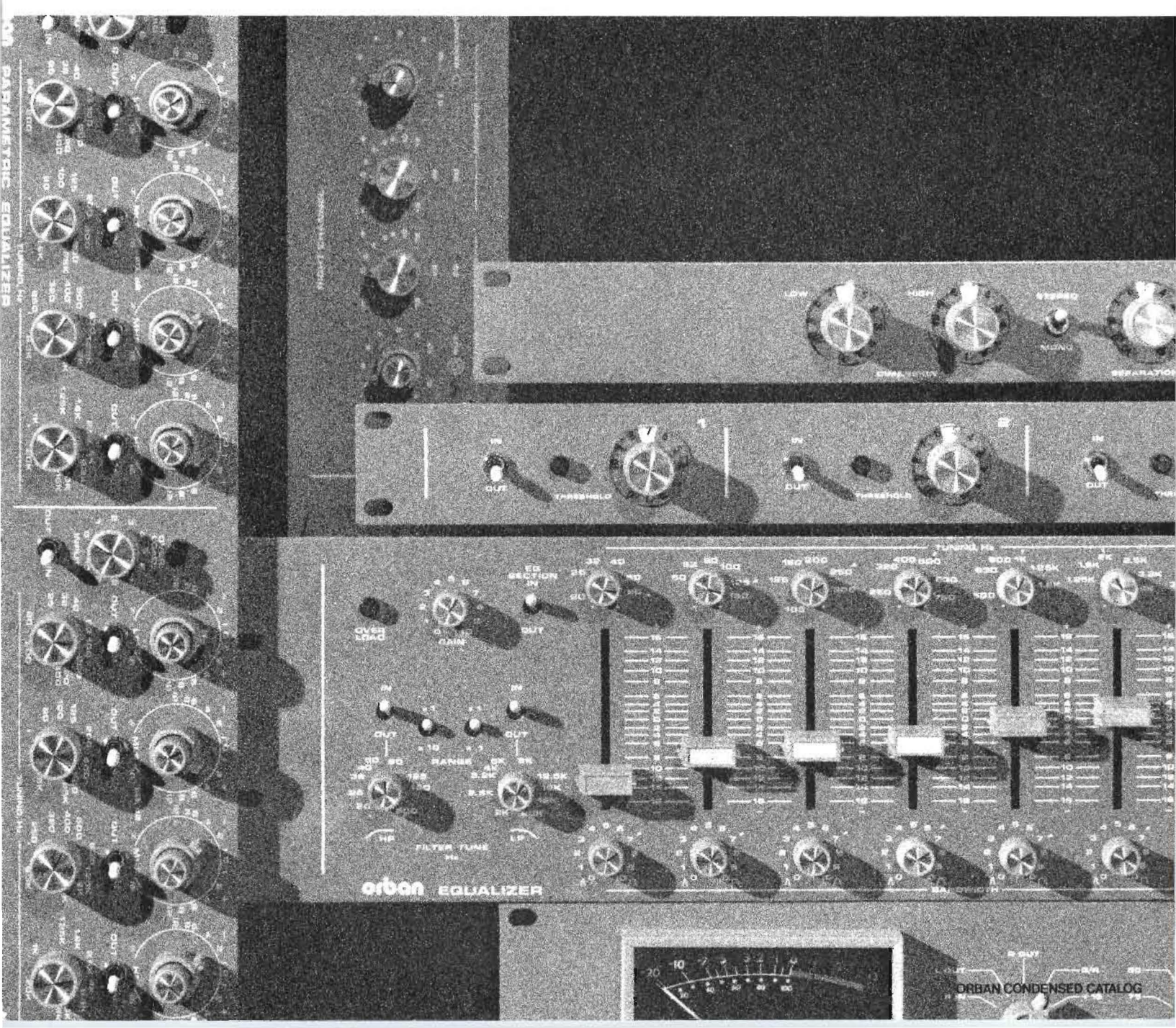
Number of Channels: two, entirely independent except for power supply.
Reverberation Element: six-spring array (per channel).
Frequency Response: See Fig. 1.
Decay Time: See Fig. 1.
Delay Time: Approximately 30 milliseconds between direct sound and first reflection.
Input Level: will accept input levels between −30 and +4 dBm. Audio-taper **Input level** attenuator available on the front panel. Limiter will control overloads up to 25 dB above limiting threshold before clipping and distortion occur.
Input Impedance: 10,000 ohms, unbalanced. Source impedance non-critical.
Output Level: nominally 0 dBm, adjustable by front panel control, ± 20 dBm clipping level allows adequate headroom for equalization and spring resonances.
Output Impedance: 600 ohms; transformer-coupled; balanced and floating.
Limiter Attack Time: less than 100 micro-seconds.
Limiter Release Time: Dual time-constant circuit adjusts release time as a function of the program.
Compression Ratio (FIXED Mode): greater than 10:1.
Limiter-Induced Harmonic Distortion (@5 kHz): less than 0.2%.
Limiter Element: Junction Field-Effect Transistor.
Bass Equalizer:
Type: Shelving
Turnover Frequency: 500 Hz.
Equalization Range: ± 12 dB, reciprocal.
Midrange Equalizer:
Type: quasi-parametric peaking.
Peaking Frequency: continuously variable, 1.5 to 5.5 kHz.
Equalization Range: continuously variable ± 12 dB, reciprocal.
Bandwidth Range: can adjust "Q" from 0.5 to 5.0 with any setting of TUNING control.
Control Interaction: TUNING and EQUALIZATION controls also vary "Q." Otherwise, all controls are independent and non-interacting.
Weighted System Signal/Noise Ratio: better than 76 dB.
Indicators:
POWER ON pilot lamp.
LED automatically lights whenever limiter is in **FIXED** mode (one per channel).
Audio Connector: Jones 140-Y barrier strip (#5 screw).
Power Connector: "U-Ground" power cord to United States standards.
Power Requirements: 115/230 volt AC ± 10%. 50-60 Hz, approximately 10 watts.
Dimensions: 19" (48.3 cm) wide x 3½" (8.9 cm) high x 12" (30.5 cm) deep.
Shipping Weight: 10 pounds (4.54 kg).

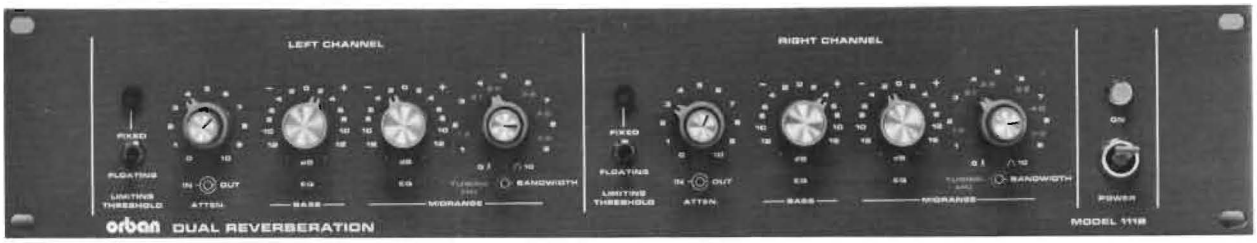
Orban Condensed Catalog

Professional Audio Products

All Orban products are designed to meet the requirements of the most demanding professional users.

Detailed brochures which include full specifications are available on request from Orban dealers worldwide.





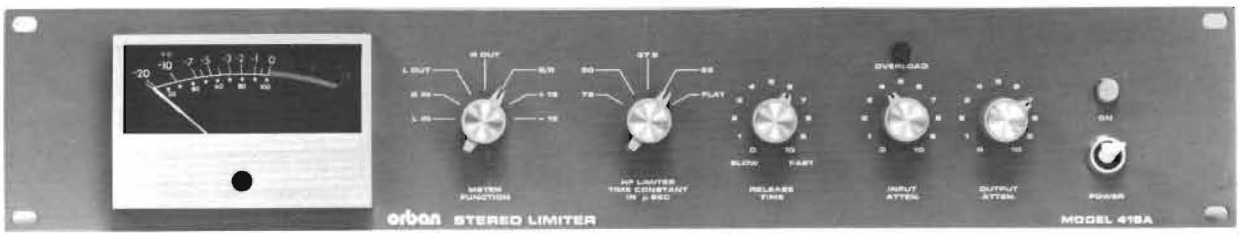
111B Reverberation

Dual-channel spring reverb with six springs/channel for smoothness and natural sound. "Floating threshold" limiter attenuates "spring twang" and protects against overload. Shelving bass and quasi-parametric midrange EQ. Unbalanced input accepts line-level or semi-pro (medium level) gear. Transformer-balanced main output; unbalanced "mixed" output allows use "in-line" without external mixers. Compact, rugged, and reliable.



245E Stereo Synthesizer

Creates a seductive pseudo-stereo effect from mono originals. Left and right channels sum back to original mono for total compatability in disc cutting and FM stereo broadcast. Doesn't affect the frequency balance of the mono original. Easy to use; only three operating controls. Unbalanced line-level input and outputs.



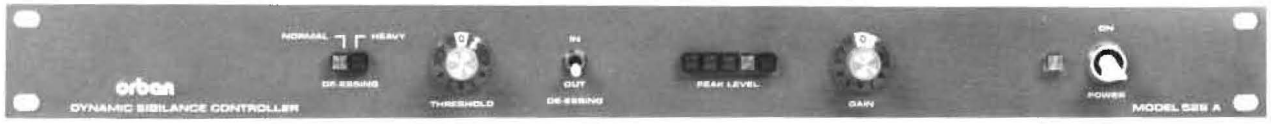
418A Stereo Compressor/Limiter

Famous OPTIMOD-FM circuitry adapted for production and recording applications. Exceptionally smooth sound with adjustable program-controlled release time. Separate high frequency limiter with four selectable breakpoints from 25 to 75us. Simple, easy-to-use stereo-ganged controls. Accurate stereo tracking. Balanced line-level inputs; unbalanced outputs. Ideal for processing complex program material in cassette duplication, broadcast production, and recording studios.



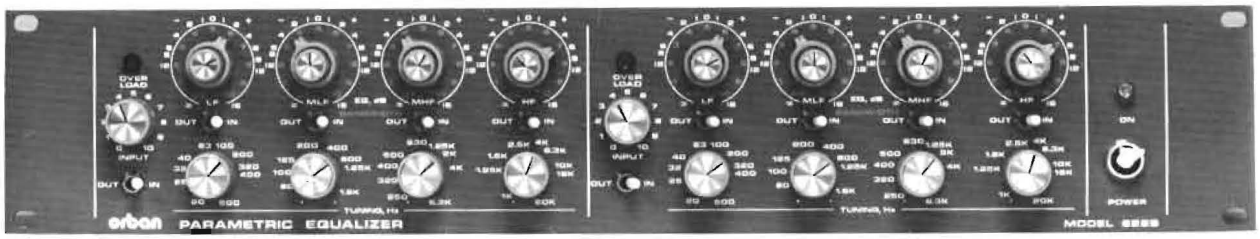
516EC Dynamic Sibilance Controller

Three-channel de-esser with unbalanced line-level inputs and outputs. Ideal for simultaneous de-essing of several voices in cinema, recording, or broadcast. Easy to adjust with single THRESHOLD control. De-essing constant over 15dB input range. De-essing defeatable without clicks or pops. Outstandingly quiet and clean.



526A Dynamic Sibilance Controller

Effective de-essing without audible "action". De-essing constant over 15dB input level range. Easy to set up and use—only two operating controls (GAIN and THRESHOLD). Fully balanced transformer-coupled input and output with mic/line switching on input. Can be inserted and removed from circuit without clicks or pops. Convenient LED level and de-essing indicators.



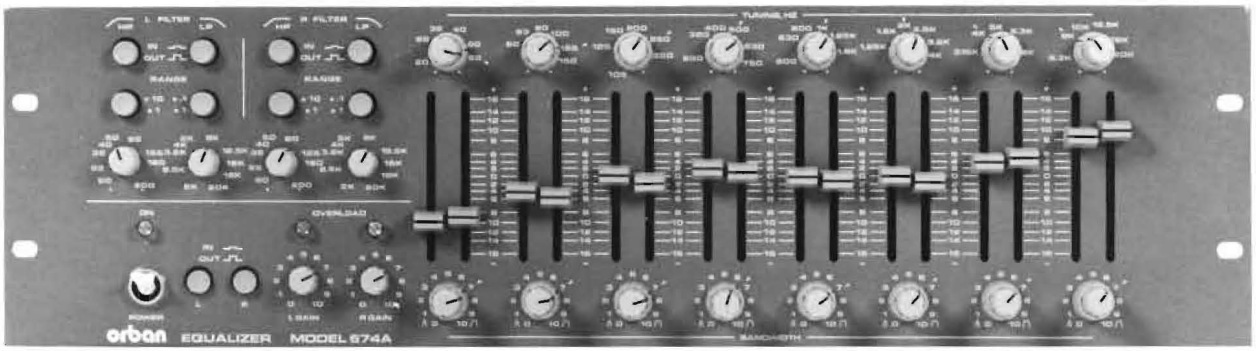
622B Parametric Equalizer

A two channel parametric equalizer for use where continuous, non-interacting control over center frequency, bandwidth, and amount of peak boost or cut is desired. Four peaking bands per channel with "constant-Q" curves providing notching capability; individual channel and band in/out switches; GAIN control; overload lamp. Line-level balanced input and unbalanced output. Output can be balanced by addition of optional transformer.



672A Equalizer

A single channel quasi-parametric equalizer with continuous control over center frequency, bandwidth, and amount of peak or dip. Convenient graphic-style EQ controls provide reciprocal EQ in eight bands. Additional 12dB/octave highpass and lowpass filters tune continuously over 100:1 frequency range. Additional lowpass output permits use as equalizer cascaded with electronic crossover. GAIN control; overload lamp; IN/OUT switches for equalizer and each filter. Line level balanced input; unbalanced outputs can be balanced with optional transformer(s).



674A Equalizer

A two-channel version of the 672A. Controls are configured to facilitate accurate, easy adjustment of both channels simultaneously when equalizing stereophonic program. Each channel identical to the 672A, including all controls and overload indicator, with the exception that the electronic crossover outputs are arranged as "MAIN/LOWPASS" and "HIGHPASS" to provide further protection against accidental tweeter burnout should IN/OUT switches be incorrectly operated.

All products are equipped with 115/230V 50-60Hz power supplies and carry a One-Year Limited Warranty covering parts and labor. All products available through franchised dealers worldwide.

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